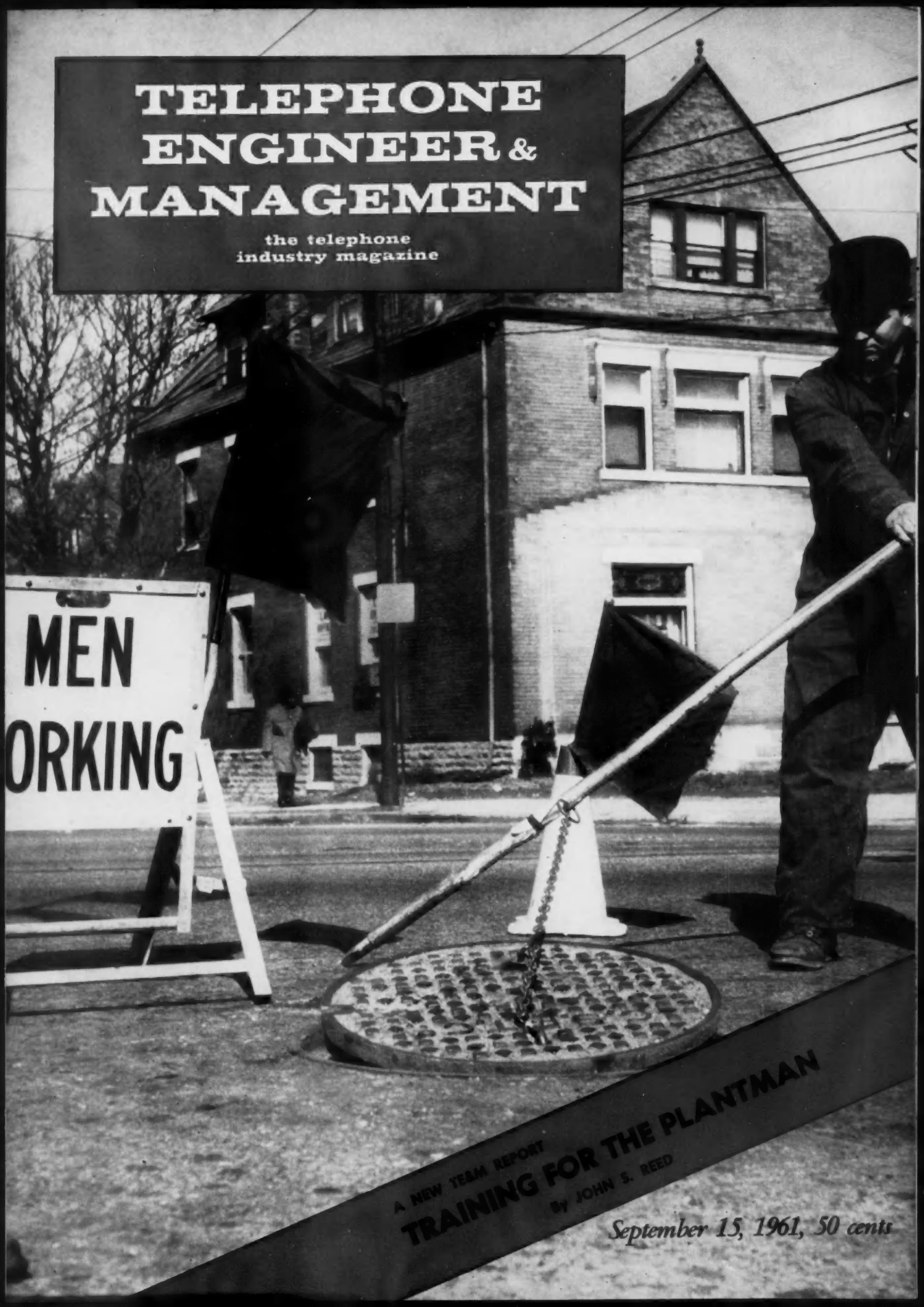
TELEPHONE ENGINEER & MANAGEMENT

the telephone industry magazine



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By JOHN S. REED

September 15, 1961, 50 cents

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Average Total Qualified Circulation for 12-month period-ending June, 1960 13,817.

The Telephone Industry Magazine

Published on the 1st and 15th of each month by

Telephone Engineer Publishing Corp., 7720 Sheridan Rd., Chicago 26, Ill. Telephone: Chicago, RO 4-3040.

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THE TE&M FRONT COVER: – The "Men Working" sign on the front cover properly sets the scene for the contents of this issue of TE&M. Cover photo shows Larry Mason, cable repairman, using manhole cover lifter to make the task easier and safer. –(*Courtesy of "The Cincinnati Telephone Bulletin."*)

TELEPHONE ENGINEER & MANAGEMENT is published on the 1st and 15th of each month by TELEPHONE ENGINEER PUBLISHING CORP., 7720 Sheridan Rd., Chicago 26, Ill. Office of Publication, 600 S. 7th St., Rochelle, Ill. Second Class Postage paid at Rochelle, Ill.

Subscriptions: U.S.A. and possessions, $4.00 per year; Canada $5.00; in all other countries $6.50. Single copies. U.S.A. 50 cents.

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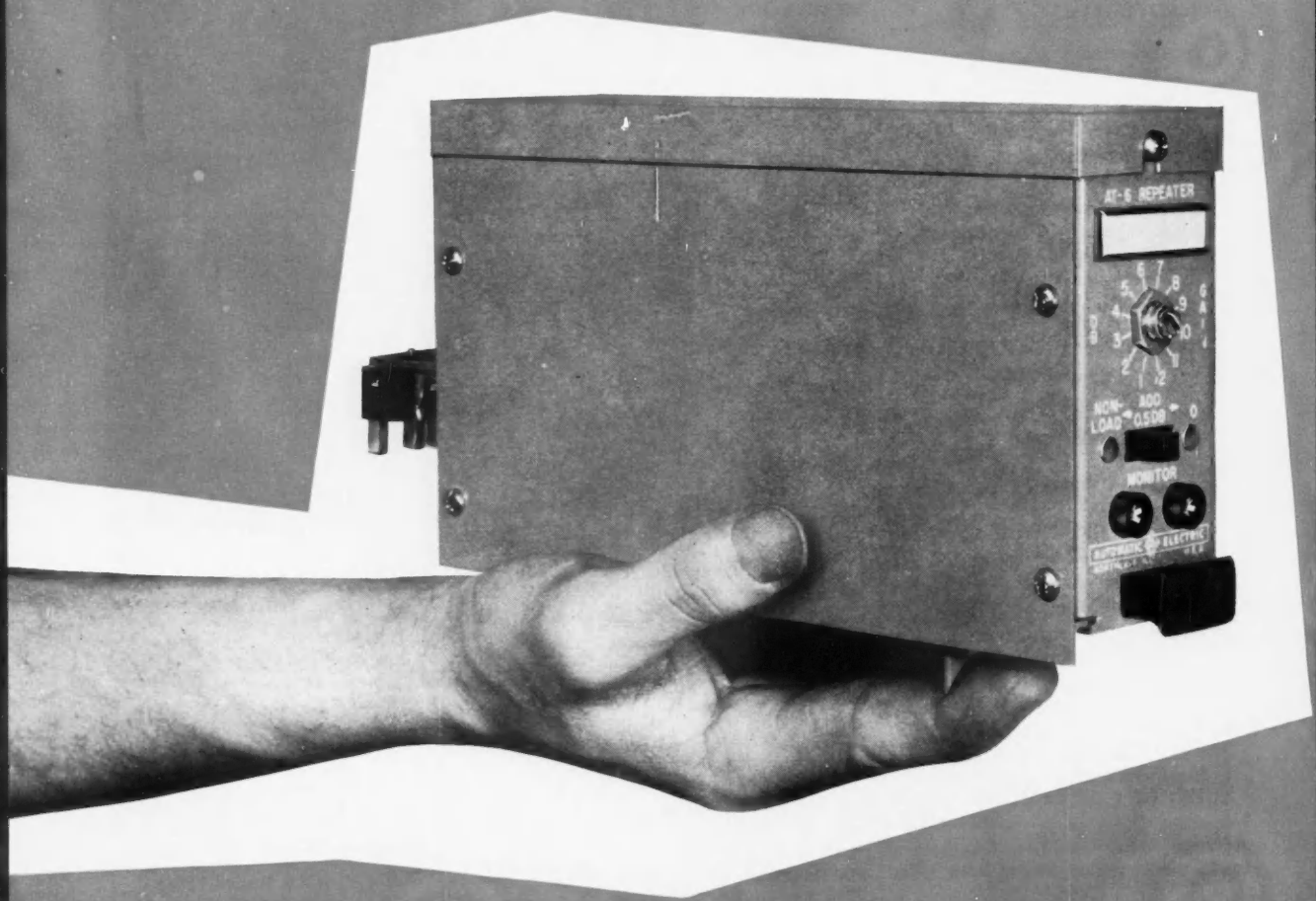

3 2

SAVES 50% MOUNTING SPACE

New AT-6 is a combination series and shunt repeater *in one case*. It offers all the advantages of AT-2 series and AT-3 shunt repeaters, but takes only *half* the space. Eight AT-6 repeaters mount on a 19" shelf. And AT-6 is fully transistorized for greater dependability, less gain loss.

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These three benefits add up to *improved transmission at lower cost* for interoffice, tandem and toll connecting trunks. Whatever your needs for better transmission—whether it's AT-6 repeaters, loading coils or cable—*AE has it*.

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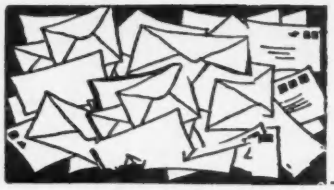
For full information on AE's new AT-6 repeater, write for Circular 1987. It describes the AT-6, new installer's set and gives complete ordering information. For your free copy, write: Automatic Electric Sales Corporation, Northlake, Illinois.



LETTERS to the editor

Reprints Wanted

To The Editor: — Will you please send us 12 copies of the *Telephone Engineer & Management Reprint*. The contents of this reprint are: Part I — Regulation and Public Interest; Part II — Regulation and Service; Part III — Regulation and the Investor; Part IV — Regulation and Free Enterprise.

Virginia L. McDermott,
Directory Supervisor-Personnel,
New York Tel Co., New York City.

TE&M readers have requested so many copies of this reprint that we're out of it. However, we're happy to send you tearsheets, and hope these will fill the need. — Editor

Likes Counts' Cartoon

To The Editor: — Some of our Business Office employes sent your August 1 issue of *Telephone Engineer and Management* to us, circling the cartoon by Jim Counts on page 32 as a possibility of our *New Jersey Bell Magazine's* humor page.

If possible, we'd like your permission to reproduce it in one of our future monthly issues. If you cannot give us such permission, could you give us Mr. Counts' address so we may contact him?

Many thanks for the cooperation and looking forward to hearing from you in the near future.

Frank J. Dwyer,
Assistant Editor,
New Jersey Bell Magazine,
Newark, N. J.

Thanks, Mr. Talmage

To The Editor: — You hit the bull's-eye again — congratulations! I have just completed reading the 12 major features and marketing articles in your Telephone Marketing Issue dated July 15, 1961. While you didn't solicit comments, your lively and instructive Marketing Issue just naturally invites a word of appreciation from one telephone man to another.

First, I was struck by your wise choice of topics which was well balanced between the several segments of the existing telephone market. Second, your profusely illustrated discussion ("Sell More — Serve More — Earn More") was especially effective in quickly getting to the heart of telephone marketing opportunities and in clearly pointing out the courses that can be pursued in profitably taking advantage of them.

Third, the facts and the inspiration furnished by your Telephone Marketing Issue should open the eyes of readers to new opportunities for greater revenue which some have underestimated. Your magazine has done a valuable service to the entire industry in emphasizing the possibilities for more profitable business. You and your competent staff are to be congratulated on publishing such a comprehensive and realistic picture of our industry's potential for doing a still better job.

To nail down the sincerity of the above reaction the enclosed bank draft is to cover extending my *twin*-subscription to *Telephone Engineer and Management* for another three years.

T. DeWitt Talmage,
ITT Telecommunications Dept.,
Chicago, Ill.

Thank You, Sir!

To The Editor: — Congratulations on the new section of TE&M — "The Telephone Notebook." Especially great were the articles under the headings of "The Really Important Person" and "Who Killed George Dey?"

Although I have not always been in agreement with the authors of TE&M, I have always found good food for thought. This is especially true on articles that can be controversial, better management and craft personnel.

I would like to thank Mr. Ehinger for his article of August 1st "Test Equipment for Your Central Office." It was a pleasure to read and know that there is someone who recognizes the need for adequate test equipment. It is hard to convince some people that we are no longer working simply with battery or ground but with difference of potentials and with complex wave forms. Thanks, friend of the technicians, for a job well done.

I am looking forward to receiving my personal copy of TE&M for a long time to come.

Eugene R. Mosley,
Toll Testman,
Ohio Bell Telephone Co.,
Canton 2, Ohio

Compares Delinquency Forms

To The Editor: — I have read with a great deal of interest your recent article concerning the treatment of delinquent accounts, which appeared in the *Telephone Engineer and Management* magazine.

It should certainly be both interesting and profitable for me to compare the different methods of account treatment of other telephone companies. I would like very much to have the copies of the various types of forms that might be used at the stages of delinquent treatment you mentioned in your last article.

A. Guy Hisle,
Commercial Supervisor,
Southern Bell Tel. & Tel. Co.,
Winchester, Ky.

Asks for Index Figures

To The Editor: — I read your informative article in *Telephone Engineer & Management* entitled "Boosting Directory Revenues."

With the possibility of adapting a base index for this company's operation, I tried to determine how you arrived at your index figures for any of the succeeding years beyond 1956, as outlined in the article. There are apparently other factors involved which were not brought to light in the article. I would appreciate your consideration and giving me the outline.

T. H. Brown, Jr.,
Commercial Manager,
The Western Reserve Telephone Co.,
Hudson, Ohio.

"Talking a Mile a Minute"

To The Editor: — Please send us a reprint of the following article which appeared in *Telephone Engineer and Management*, July 15, 1961 issue: Part One of a Special Report — "Talking a Mile a Minute" pp. 32 to 34, 70. Your assistance in this matter will be greatly appreciated.

Harry Rezab,
Technical Editor,
United States Instrument Corp.,
Charlottesville, Va.

There's a lot more to the NEW FLOTROL RECTIFIERS than silicon diodes!

Lorain has not just designed for silicon diodes. The idea of improving on the already established, reliable, selenium-rectifier FLOTROL units beyond the mere incorporation of silicon diodes was a challenge to our engineers. In accepting this challenge an entirely new approach, both mechanical and electrical, was in order. From this work a radically new unit having improved physical and mechanical features and having highly advantageous, new electrical characteristics has been developed.

FROM THE PHYSICAL AND MECHANICAL STANDPOINT THE NEW UNITS ARE OUTSTANDING

The attractive appearance speaks for itself.

All operating controls, operating alarm lamps and breaker switches are placed at a single, convenient location—on the meter panel at the front of the unit.

All terminations are convenient, safe and adequate—for utmost simplicity of installation.

Component location and cabinet design have both been carefully considered—all components are readily and conveniently reached by the mere removal of a cover. Both plug-in and hinged mounting of components are utilized—the new FLOTROL rectifiers are the ultimate in accessibility for service.

ELECTRICALLY, THE NEW MODELS ARE SUPERIOR

TRANSFORMER TAP SIMPLIFICATION—screwdriver shaft adjustment takes care of the entire range of output voltage—transformer taps are used only for line voltage adjustment.

FAIL-SAFE—batteries and office equipment are protected against any type of failure. The unit shuts off or the output voltage drops upon failure in the circuit.

SOMETHING NEW IN ALARMS—in all three-phase and large single-phase units, the auxiliary circuits are individually alarmed with alarm-type magnetic circuit breakers adapted to operate the office alarm as well as the alarm lamp on the meter panel. Upon tripping of any of the critical circuit breakers the rectifier is automatically shut down.

THE RADICALLY NEW CIRCUITRY results in reduction in the size of the units—improved performance—protection of the silicon diodes against starting and load surges—frequency compensation—load sharing paralleling with other FLOTROLS and with motor-generator sets—temperature compensation for operation up to 55° C. ambient.

As usual in Lorain design, all components are conservatively rated for maximum dependability.

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NEW ENGLAND Tel. Assoc., Poland Springs Hotel, Poland Springs, Maine, Sept. 24-27.

WEST VA. Tel. Assoc., Oglebay Park Hotel, Wheeling, W. Va., Sept. 26-27.

USITA CONVENTION, Conrad Hilton Hotel, Chicago, Ill., Oct. 8-11.

NATIONAL Society of Professional Engineers, Hotel Roanoke, Roanoke, Va., Oct. 19-21.

SOUTH CAROLINA Tel. Assoc., Clemson House, Clemson, S. C., Oct. 23-24.

VIRGINIA Tel. Assoc., Roanoke Hotel, Roanoke, Va., Oct. 26-27.

OKLAHOMA Tel. Assoc. Skirvin Hotel, Oklahoma City, Okla., Nov. 8-9.

ALABAMA-MISSISSIPPI Tel. Assoc., Thomas Jefferson Hotel, Birmingham, Ala., Nov. 12-14.

FLORIDA Tel. Assoc., The Carillon Hotel, Miami Beach, Fla., Nov. 26-28.

NORTH CAROLINA Tel Assoc., Carolina Hotel, Pinehurst, N. C., Dec. 4-5.

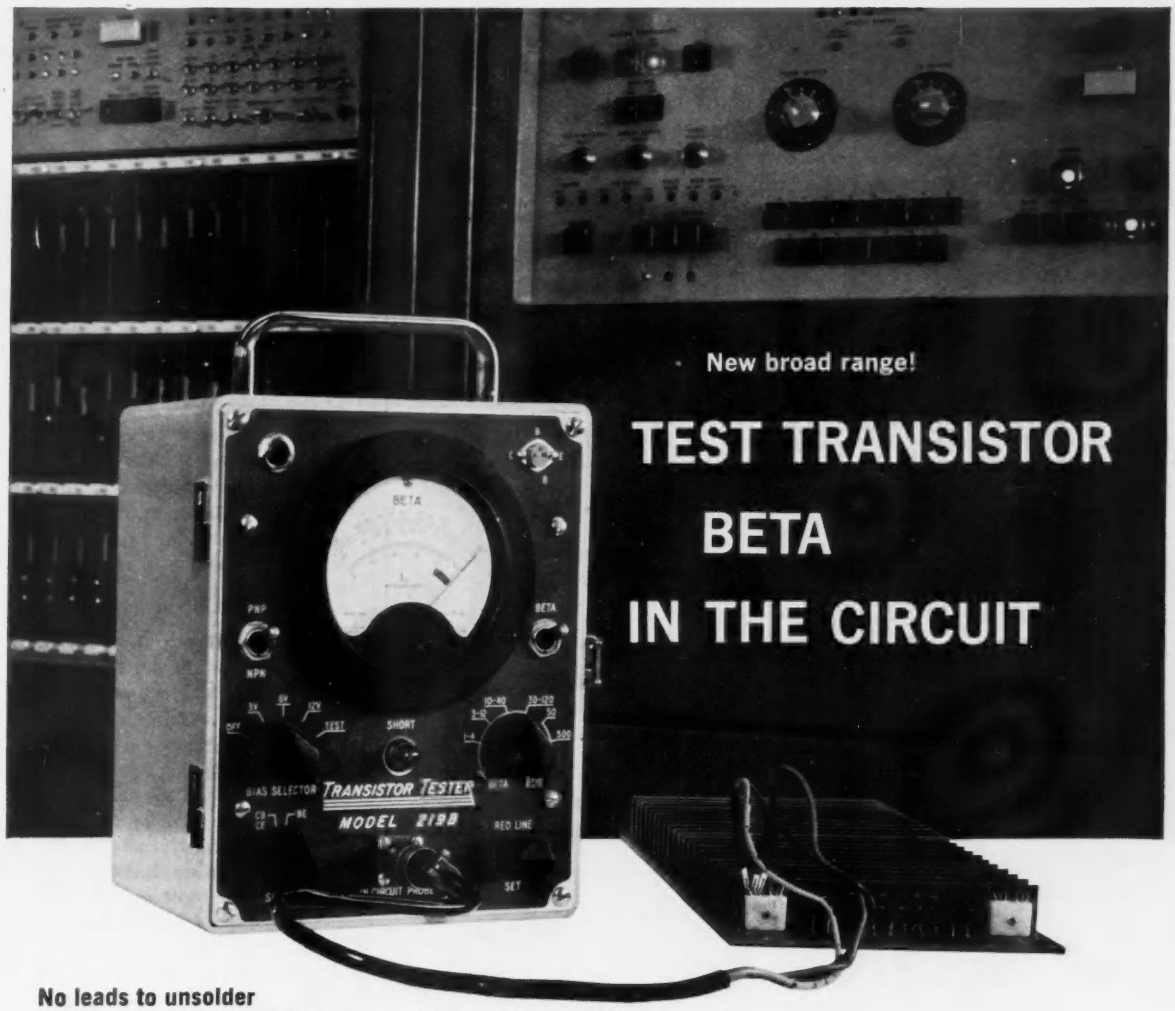
NATIONAL Tel Coop. Assoc., Jung Hotel, New Orleans, La., Jan. 15-17, 1962.

MINNESOTA Tel. Assoc.,Radisson Hotel, Minn., Minn., Feb. 25-28, 1962.

KENTUCKY Tel. Assoc., Phoenix Hotel, Lexington, Ky., Mar. 6, 1962.

TEXAS Telephone Assoc., Sheraton-Dallas Hotel, Dallas, Texas, Mar. 11-13, 1962.

MISSOURI-KANSAS Tel. Assoc., Town House Hotel, Kansas City, Kan., May 21-22, 1962.



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Test ranges	
Beta	1-4, 3-12, 10-40, 30-120*
I_{CO}:	0-50, 0-500 ua
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In circuit:	±20% for external loads over 500 ohms. Improved accuracy above 500 ohms, usable readings below 500 ohms.
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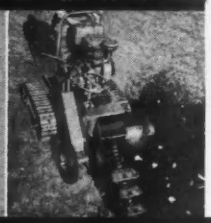

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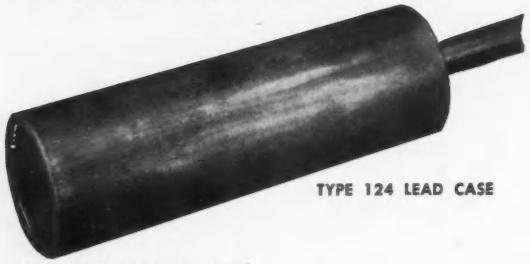

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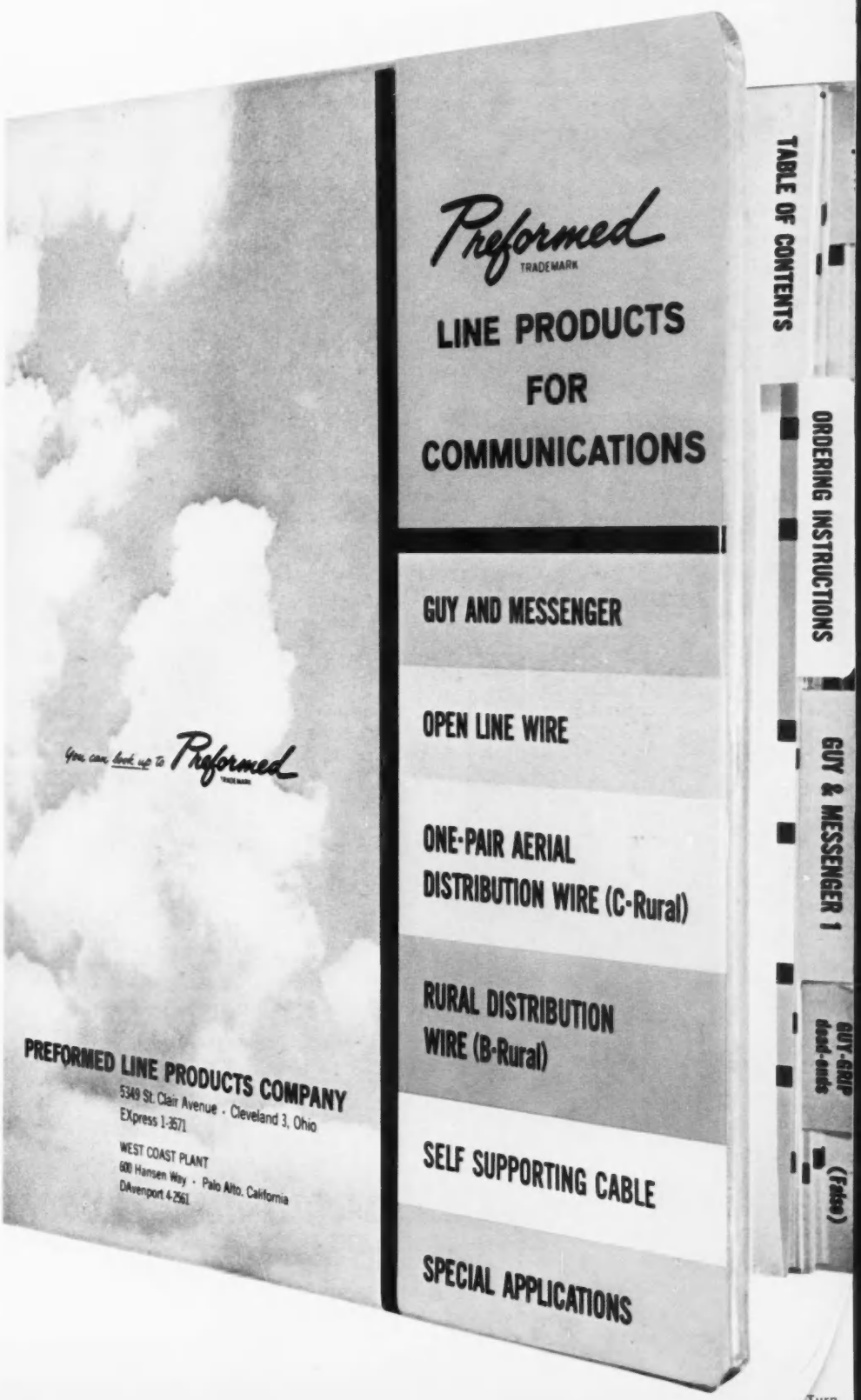
50 YEARS AGO IN T E & M

■ The TE&M editorial stated: *"When every farmer's line has become part of a larger system, and when every mutual system is made commercial, there will be a more determined effort to gain subscribers, and a more rapid telephone growth. We sometimes decry commercialism, but the trouble with the telephone business is that there is not commercialism enough in the broad stretches of the country."*

■ Sarah Elizabeth Brown told her readers: — *"I am informed that the volume of money in circulation in September was* $13,200,000 *in excess of August. The circulation per capita amounted to* $34.35, *which represents an increase of* 10 *cents for the month. Hurrah for the* 10 *cents. That's exactly what I had left after I got my new fall hat which looks like a fuzzy ice cream cone with a feather in it. It does beat all that is offered these days to jolly us into the belief that there isn't something wrong with the country. Ten cents for September! Pardon me while I snicker in my kimono!"*

■ In Tucson, Ariz., the government announced its plans for using giant cacti for telephone poles. Builders of the system stated the *"giant cacti will not be sawed off and set up or transplanted, but will be used as a pole where it is found practical."*

■ A report on the use of automobiles in telephone work stated that the Boston Div. of the New England Tel. & Tel. Co., used 38 automobiles and 18 motorcycles. The Chicago Tel. Co. reported it used 21 Holsman runabouts, and 7 Brush runabouts.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SPECIAL APPLICATIONS
TABLE OF CONTENTS
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GUY & MESSENGER 1
GUY-GRIP dead-ends
(False)

Turn page

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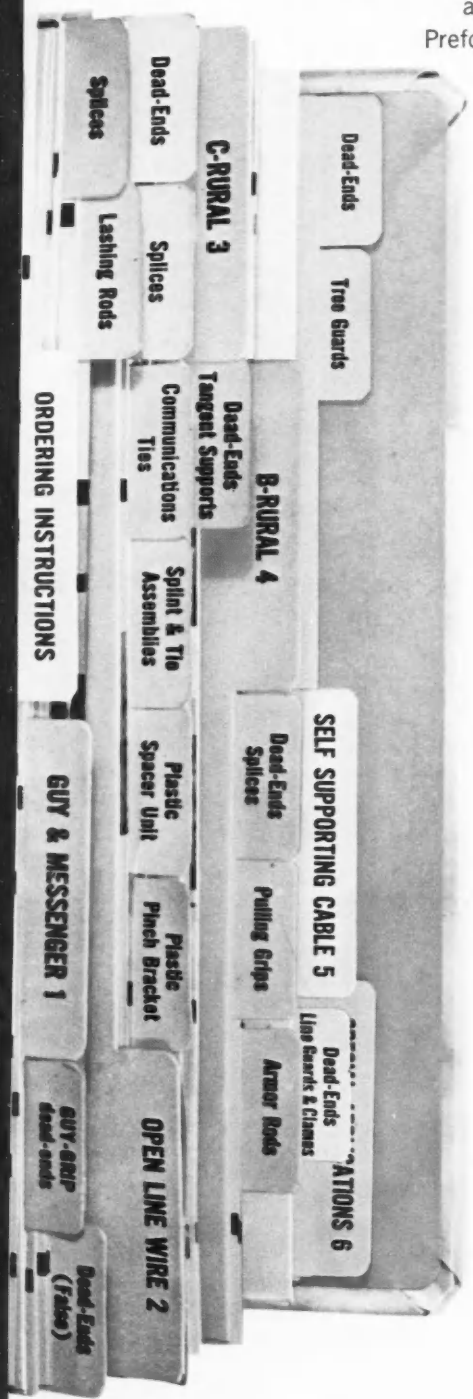

GUY & MESSENGER

- ☐ GUY-GRIP dead-ends
- ☐ Dead-Ends (False)
- ☐ Splices
- ☐ Lashing Rods

OPEN LINE WIRE

- ☐ Dead-Ends
- ☐ Splices
- ☐ Communications Ties
- ☐ Splint and Tie Assemblies
- ☐ Plastic Spacer Units
- ☐ Plastic Pinch Brackets
- ☐ Plastic Vibration Dampers
- ☐ Armor Rods

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- ☐ Dead-Ends
- ☐ Tangent Supports

B-RURAL

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- ☐ Splices
- ☐ Pulling Grips
- ☐ Armor Rods

SELF SUPPORTING CABLE

- ☐ Dead-Ends
- ☐ Line Guards
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SPECIAL APPLICATIONS

- ☐ Dead-Ends
- ☐ Tree Guards

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The products in this advertisement are made in accordance with or for use under one or more of the following U.S. Patent Numbers: 2,691,865; 2,761,273; 2,744,707; 2,929,195; 2,947,504; and 2,959,632; other patents pending.

NEWSLETTER
TELEPHONE INDUSTRY

Prepared By The Editorial Staff of TELEPHONE ENGINEER and MANAGEMENT

ON THE 1st OF EACH MONTH ★ ON THE 15th OF EACH MONTH

Dear Sir: September 15, 1961

FCC MAKES CHANGES IN EMPLOYE CENSUS, WAGE & HOUR REPORT PROCEDURES . . . Rule changes in FCC annual report forms for Class A and B telephone companies, to change annual count of employes to Dec. 31 instead of last business day in Oct., were approved by Commission last month. Also changed were wage brackets in annual report forms for telephone & telegraph carriers, to reflect amendments in federal minimum wage law. Employe census date was changed from Dec. 31 during World War II, when many reports were due at end of year & mechanized office procedures were less prevalent.

SOUTHERN BELL PROPOSES ADJUSTMENTS IN TENNESSEE INTRASTATE RATES . . . Southern Bell Tel. & Tel. Co. has asked Tennessee Public Service Commission for authority to modernize rate schedules on intrastate toll rates. New schedules would shorten some initial talking periods & lengthen others, and are "designed to make station-to-station calling more attractive and encourage the use of mechanized & improved long distance service," J. M. Brown, Southern Bell's Tennessee General Commercial Manager said. Company's proposal includes wider differential between person-to-person rates & station-to-station rates, resulting chiefly from lowered station-to-station charges. By August, it was pointed out, about 72% of Southern Bell's customers in Tennessee will be able to dial their long distance calls.

MACMILLAN GOVERNMENT BOOSTS MOST G.P.O. TELEPHONE SERVICE RATES . . . Increases in telephone & postal rates of British General Post Office, intended to produce about 25,000,000 pounds, or $70,000,000, a year in added revenues, were announced last month by Postmaster General Reginald Bevins immediately prior to submission of plans by Prime Minister Harold Macmillan's government for rigid "austerity" program in Great Britain. GPO makes annual rental charge for telephone service, & this will be boosted by two pounds, or $5.80, a year, increasing present charges which range from 10 to 14 pounds annually. There is to be no increase in per-call charge made.

Service connection charges were raised to 10 from five pounds, & removal charge was upped to three from two pounds. Extension rentals, private branch exchange rentals, & coin box rentals were also boosted, & new service connection charges for coin boxes & private lines were added to schedules. Present three-pound additional installation charge for color telephones was cut in half.

Postmaster General Bevins declared rates were being raised to enable GPO to provide its own capital development, rather than using money from treasury for expanded service. He declared "The public will never get the service to which it is entitled unless it is prepared to pay economic prices."

FOR YOUR FACTS FILE . . . . Steel Ingot production in 1961 is expected to reach 100 million tons ,about same as in 1960. Output in second half should gain 10 million tons over first half to 55 million tons. (1) Aluminum & magnesium shipments are expected to exceed last year's . . . . Only one in ten young men 20 to 24 years old has had less schooling than his father, four in 10 having reached same general level of education & five in 10 having gone beyond their fathers. In contrast to 33 percent of fathers, about 68 percent of sons have been graduated from high school . . . . Only handful of Cuban Subsidiaries & affiliates of U. S. firms had

(Continued from page 11)

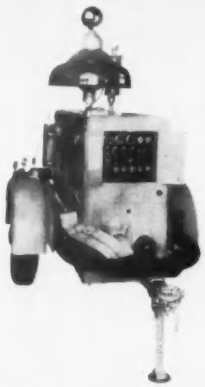
escaped confiscation by start of this year. They represented perhaps one-half of one percent of U. S. investment in Cuba in January 1959. Probably more than $1 billion in U. S. investments was confiscated during 1960 . . . . Revenue of city governments in fiscal 1960 approximated $15 billion, 8.5 percent greater than in 1959. Spending of $15.3 billion by 18,043 cities compared with $14.5 billion in preceding year.

WITH THE COMMISSIONS . . . In MINNESOTA, Federated Tel. Co-op authorized to change rates & charges at its Chokio, Odessa, Correll, Holloway & Danvers exchanges . . . In NEW YORK, Sylvan Lake Tel. Co., Hopewell Junction, authorized to increase rates to subscribers receiving 5-party rural service. Rates to 995 rural residential subscribers will be boosted by 50 cents monthly; 85 rural business subscribers will pay 75 cents more each month . . . In ARKANSAS, Commission (1) approved plan of United Tel. Co. of Alma to sell its system to Ozark United Tel. Co., a newly-organized firm; (2) authorized Wickes Tel. Co. to borrow up to $344,000 from REA . . . In INDIANA, Indiana Bell Tel. Co. asked State Public Service Commission to invoke agency regulation to help settle dispute between it and General Tel. Co. of Ind. Companies are in disagreement over collection of long-distance tolls exchanged between them totaling about $600,000 month. . . . In WISCONSIN, Governor Nelson signed into Wisconsin law legislative bill providing penalties for defrauding telephone companies by using another person's credit card number without his permission, or charging a call to non-existent number.

TELEPHONE NEWS HIGHLIGHTS . . . Hawaiian Tel. Co., Honolulu, filed statement with Securities & Exchange Commission seeking registration of 782,144 shares of common stock, of which 711,040 shares will be offered for subscription by present stockholders at rate of one new share for each six shares held. Remaining 71,104 shares are to be offered to employes at subscription price . . . FCC authorized Southwestern Bell Tel. Co. acquisition of Farmers Mutual Tel. Exchange, Weatherford, Okla. Weatherford is last point in Southwestern Bell territory where Bell company & another company compete in offering local service . . . British Columbia Tel. Co. reported net income for first half of 1961 was $3,793,381, compared with $3,374,955 for same period of 1960. Company had 555,809 telephones in service at mid-year, an increase of 8,479 during first six months of 1961.

PEOPLE IN THE NEWS . . . John E. Kremers has been named general accountant in Comptrollers Department of American Tel. & Tel. Co. He was general accounting personnel supervisor, Wisconsin Tel. Co., Milwaukee . . . W. F. Johnson, superintendent of telephone & telegraph communications, United Air Lines, Denver, Colo., elected president, Industrial Communications Assoc. . . . William R. Francis named vice president – plant by Western Union Telegraph Co. He succeeds Ray Hoover, who retired after 42 years of service . . . Mark R. Sullivan, who retired in 1960 as president of Pacific Tel & Tel. Co., has been elected president & a director of Dialaphone Corp. & director of Perini Corp., the parent company, of Framingham, Mass. . . . James W. Tedrow elected corporate secretary of Lenkurt Electric Co., San Carlos, Calif. He was member of legal staff, Automatic Electric Co., Northlake, Ill. . . . R. E. Young named chief engineer Alberta Government Telephones. He succeeds D. S. Edwards, retired . . . R. G. Ades named general commercial manager, Alberta Government Telephones. He succeeds H. H. Doucette, retired . . . Ernest M. Menendez, Florida Div. Mgr., Southeastern Tel. Co. elected vice pres. of the company . . . Leroy E. Lattin, pres. General Tel. Co. of Calif., elected member of board of directors of Packard-Bell Electronics.

Pioneers in CONTINUOUS FEED PRESSURE SYSTEMS & MAINTENANCE EQUIPMENT



MOBILE POWER UNITS

Portable generator, pump, air compressor and desiccant dryer used for underground cable splicing and similar work — can be set up and operated by one man.

Write for Bulletin MPU-1-61

MICRO-WAVE & CDO DRYER

Available in two sizes:
Model MWD-200
Model MWD-350

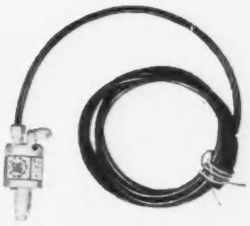
See it at the U.S.I.T.A. Convention, Room 641-A

Write for Bulletin MWD-1-61

CABLE REEL PRESSURE ALARM PART NO. 8279

Used when cable is plowed in under pressure. When cable sheath is damaged in process of plowing in, the alarm will sound indicating damage of sheath and location can be marked and damages repaired.

Write for Bulletin No. 8279-1-61



ADJUSTABLE CONTACTOR PART NO. 8296

For use on cable under pressure where Temperature Change is severe, this contactor is set at installation with air pressure, and temperature will not affect its setting. Air tight, water proof, patented air chamber method.

Write for Bulletin No. 8296-1-61

FREON-12 Dispensing Assembly 1 lb. size (5 lb. Size also available)

FREON TEST KIT NO. TK-100

This kit contains complete facilities for charging cables with Freon (F-12), plus: propane type halide gas detector, 20 feet of ½" dia. plastic hose, and a bracket assembly for connecting detector to pruner pole. An extra propane cylinder and 1 lb. can of Freon are also provided.

Write for Bulletin TK-100-1-61

AIR FLOW INDICATOR PART NO. 8177

An invaluable accessory for use in locating leaks in telephone cables under air pressure — comes in its own plastic case. Many other accessories and plastic air supply lines are available for pressurizing systems.

Write for Bulletin No. 8177-1-61

S&G MFG. CORP.

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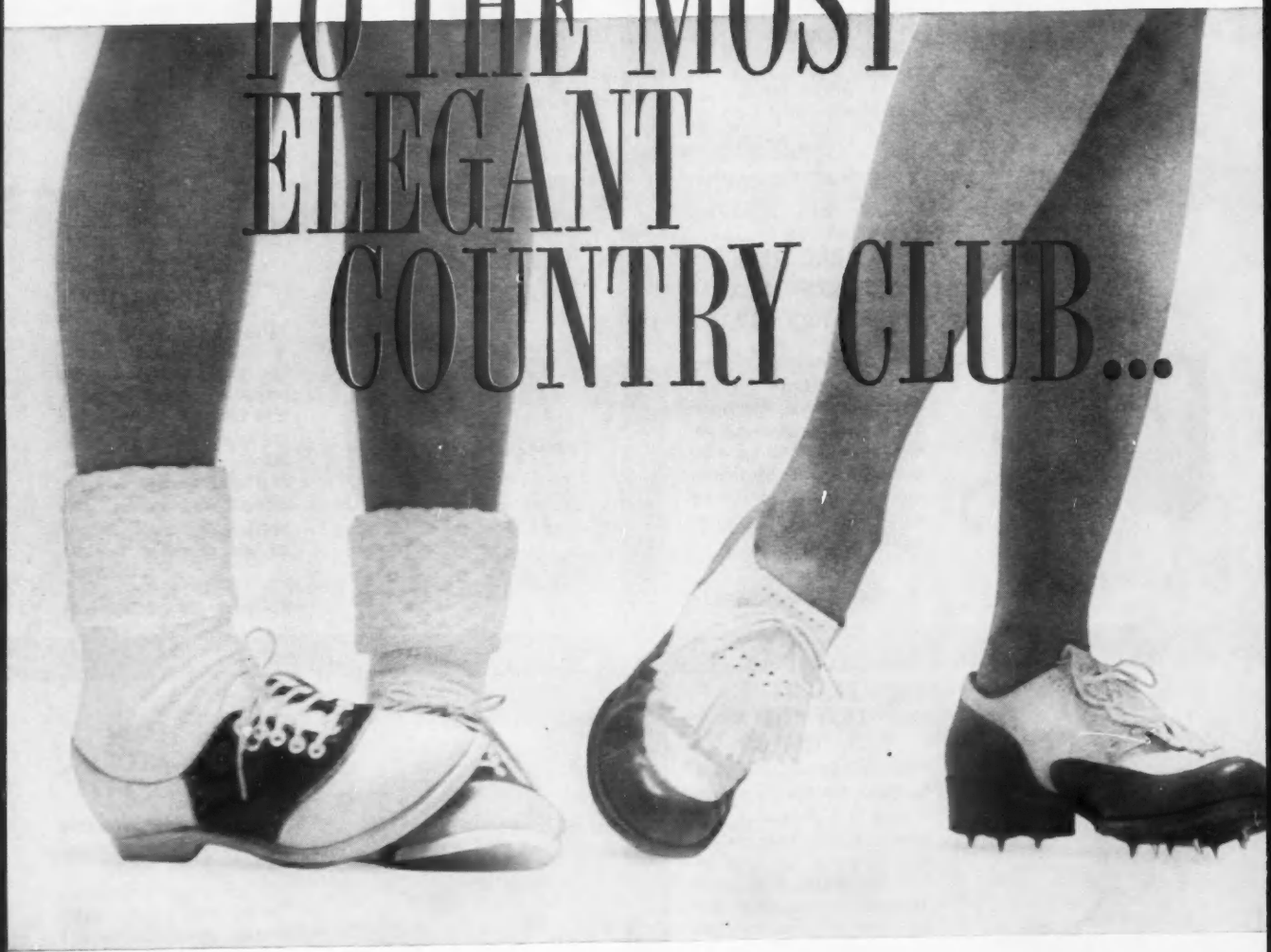
S & G EQUIPMENT MEANS QUALITY, ECONOMY AND DEPENDABILITY

FROM THE CORNER DRUG STORE TO THE MOST ELEGANT COUNTRY CLUB...



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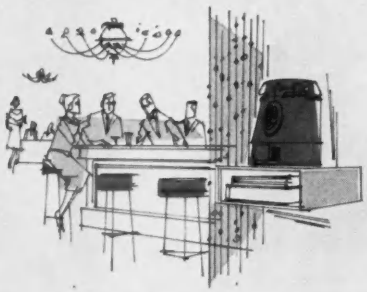
ITT KELLOGG PAYSTATIONS BELONG EVERYWHERE

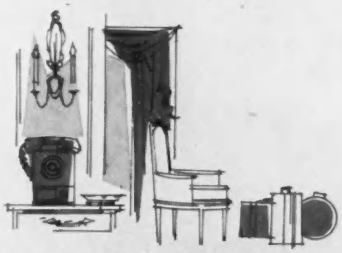
ITT Kellogg Paystations can be quickly installed practically anywhere: in booths or boothettes, on counter tops, can even be used as a *portable* pay phone. Ease of installation, plus maximum security, are achieved through base plate mounting.

Features rugged 2-section pressed steel housing...many standard, and interchangeable, K-500 parts, including K-500 handset and dial mechanism...coded keys, coded self-locking coin boxes...loop resistance 1000 ohms including the instrument. Also available with slug magnet, spare coin box, universal mounting adapter.

In ivory, light beige, light grey. For dial or manual service.

• *ideal for semi-public use . . . eliminates "free calls" from restaurants, lounges, motels, country clubs, etc.*





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Mostly About People You Know

John Voss President of New Gen. Dynamics Division

LAST MONTH General Dynamics Corp. announced the formation of a new division General Dynamics | Telecommunication. The new division, headquartered at Rochester, N. Y., produces the Stromberg-Carlson line of telephone equipment for the independent telephone industry. It was formerly a part of General Dynamics | Electronics. In view of the growing importance of the corporation's telephone business, Frank Pace, Jr., chairman of the corporation, said this division now merits independent status.

John H. Voss, vice president and general manager of the telecommunication operation for eight years, has been appointed president of the new division and a senior vice president of General Dynamics Corp.

In a related move, the Corporation announced the unification of the remaining operations of General Dynamics | Electronics with those of General Dynamics | Pomona.

General Dynamics | Electronics, which has operations in both Rochester, N. Y. and San Diego, Calif., produces electronic equipment for defense, industry, and the home. General Dynamics | Pomona produces the advanced Terrier, Tartar, Redeye, and Mauler Missile Systems, and advance defense electronic systems.

The combined operation will be headed by Charles F. Horne as president. Horne is president of General Dynamics | Pomona and a senior vice president of General Dynamics, and has been with the corporation for many years.

"The most recent move" said Pace, "is a continuation of the consolidation of the electronic activities begun earlier this year. By combining the direction and competence of these two electronic oriented divisions, we

JOHN H. VOSS

feel we can strengthen our position in a fast moving industry both in end product and in support operations to weapons systems and to provide more rapid development and greater flexibility."

Pace emphasized that existing operations will be continued at their current geographic locations.

John H. Voss, the newly-elected president of General Dynamics | Telecommunication and senior vice president of General Dynamics Corp. is a "Telephone mans' man."

Voss has been at Stromberg-Carlson since 1946 in various engineering capacities, becoming vice president and general manager of the Telecommunication Division of Stromberg-Carlson before its merger with General Dynamics Corp. He remained as vice president and general manager of the Telecommunication Division of General Dynamics | Electronics.

Born in Manila, the Philippine Islands, June 10, 1902, Voss is a 1920 graduate of the Bliss Institute of Technology, Washington, D. C., where he majored in electrical engineering.

He joined Stromberg-Carlson as head of the Circuit Development and Testing Laboratory for XY Dial and Relay Dial Systems. Two years later he was appointed section head of Dial Systems Engineering, and in 1949 he became chief engineer of the Telephone Division. He continued in that capacity until being advanced to the post of vice president and general manager of the Telecommunication Division in 1954.

Prior to joining Stromberg-Carlson Voss was associated with the Automatic Electric Co., Chicago, Ill., where he served as a test engineer from 1920 to 1928, project design engineer from 1928 to 1936, and senior project engineer in research and development from 1936 to 1946.

Voss is a registered professional engineer in the State of Illinois. He holds 62 patents in the field of telephone equipment. He is a member of the Telephone Pioneers of America, the American Management Association, the Armed Forces Communications and Electronics Association, the Rochester Chamber of Commerce, and the Rochester Industrial Management Council. He is a director of The Stromberg-Carlson Credit Corporation.

Automatic Names Dempsey to Advanced Phys. Development

DR. MARTIN E. DEMPSEY is now supervisor of advanced physical development with the Research Department of Automatic Electric Laboratories, Inc., Northlake, Ill. He will conduct research and advanced development programs in acoustics, voice transmission, and magnetics.

DEMPSEY

Dr. Dempsey came to Automatic Electric from Beltone Research Laboratory, where he was director of psychoacoustic research. Previously, he was director of aid-to-hearing research for Zenith Radio Corp. He also has done research work for Purdue University's Voice Communications Laboratory and Bell Telephone Laboratories.

Receiving his BS, MS, and Ph.D

Here is a plan to help you

REDUCE SUFFERING AND TRAGEDY

With it, your company can SAVE PRECIOUS LIVES, *while* CUTTING COSTS DUE TO ABSENTEEISM *by as much as 1/3 to 1/2!*

Together, American management and labor have done a remarkable job of reducing the incidence of industrial accidents. In-plant safety campaigns have been so effective that today it is *nonwork accidents* that cause the bulk of lost lives and manhours in our economy.

The National Safety Council has developed a plan to reduce these accidents. Not only will it save lives and prevent crippling injuries, but it will add significantly to the efficiency and net profits of companies which put it into operation.

Let's say you're an average company or corporate unit doing $1 million in sales a year. Your net is around $73,000. National Safety Council figures show that the average nonwork accident costs employers about $72. (You can determine *your* costs with the Council's new nonwork accident report system.) Ten such accidents can cost $720—or about 1% of your net profit. Prevent those accidents and you can *add 1% to your net!* Prevent twenty—and add 2% to net!

Experience shows that a reduction of nonwork accidents by 30% is possible! One large company with an excellent in-plant safety record has *cut nonwork accidents by 1/3* with its off-the-job safety program! It's employee's rate for motor vehicle fatalities stands *85% below rate for all U.S. workers!* And its already low *in-plant accident rate came down 50 per cent!*

Here is a rewarding endeavor that pays immeasurable dividends in human and employee relations—as well as an important untapped source for cost control. You can institute this kind of program in your company. Send the coupon for a copy of our booklet "The Challenge to Management of Off-the-Job Accidents." It will show you how to determine your non-work accident costs, as well as many tested ways to reduce this steady waste of lives and profits. Send the coupon today.

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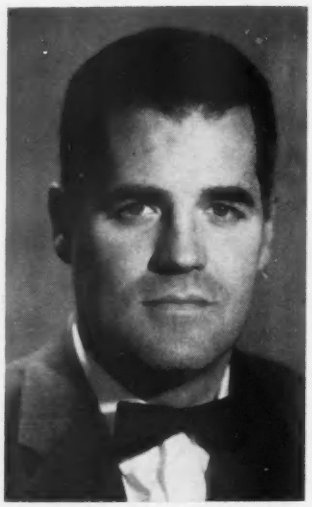
"Mostly About People"

(Concluded from page 16)

degrees in electrical engineering from Purdue University, Lafayette, Ind., his principal activity has been investigation of relationships between physical and psychophysiological attributes of speech communication.

R. E. Dorsett Named TE&M Managing Editor

ROBERT DORSETT, a graduate of the University of Missouri School of Journalism, has joined the TE&M staff as managing editor. Most recently, he has been managing editor of the *National Safety News* magazine, a National Safety Council publication, where he worked for the past 3½ years.



BOB DORSETT

Dorsett has worked as newspaper reporter and wire service editor for the *Anchorage (Alaska) Daily News*; associate editor of the *Genesee Country Express and Advertiser*, a weekly newspaper in New York state; editor of *Mobile Homes Manufacturer and Buyer's Guide*.

He also has been managing editor for *Research and Development* magazine, specializing in the field of industrial research and development, and has worked in an editorial capacity for *Popular Mechanics* magazine.

After joining *National Safety News* magazine in 1958, he wrote articles on industrial safety in the chemical, automotive, food processing, and related fields, and on subjects ranging from language and handicap barriers to construction, use of synthetic ropes, and light-heat-and-ventilation hazards.

His job headquarters have been in the Chicago area. Dorsett, his wife and three children live in Wilmette, Ill.

Fifty-four top engineering executives from telephone companies in 18 states, Colombia and Canada concentrated on problems of economics and finance at the fifth annual USITA Telephone Engineering Conference July 25-August 14 at Michigan State University, East Lansing. Class members shown above are: FIRST ROW — Front (l. to r.) — THEODORE DALLMAN, Milwaukee; JERRY LANDERS, San Angelo, Texas; JACK PEDRICK, Bluefield, W. Va.; KENNETH J. CARR, Fort Dodge, Iowa; JACK W. STORY, Vancouver, B. C., Canada; RICHARD G. HAVER, Chicago, Ill.; CURTIS M. HELMS, Sherman, Texas; ANGELO TABANELLI, Tallahassee, Fla.; GLENN W. CURL, Marion, Ohio; GEORGE N. KING, Grinnell, Iowa; H. L. ERICSON, Hector, Minn.; TOM COLLINS, Conference Consultant, Michigan State University, Kellogg Center; NEAL J. MACON, Hickory, N. C.; VICTOR L. KOON, Honolulu, Hawaii; RONALD C. BISHOP, Long Beach, Calif.; SECOND ROW (l. to r.) — HARLEY McDONALD, Chicago, Ill.; EVERETT JUERGENS, Tampa, Fla.; JIM SEWARD, Palm Springs, Calif.; EUGENE SHEETZ, Edinburg, Va.; CARLOS HERNANDEZ, Bogota, Colombia; JOSEPH O'ROURKE, Tampa, Fla.; EDWARD HINSHAW, Indianapolis, Ind.; MR. NIZIOLEK, Madison, Wisc.; JAMES H. SMITH, Kittanning, Pa.; PAUL WENSTROM, Gig Harbor, Wash.; ERNEST W. TRAUT, Johnstown, Pa.; GEORGE ROSS, Brownwood, Texas; ROBERT RITLAND, Sycamore, Ill.; A. F. WILLIAMS, Warren, Ohio; V. G. RITTER, Franklin Park, Ill.; NORMAN A. ADAMS, Cleveland, Ohio; THIRD ROW (l. to r.) — JAMES MILLER, Durham, N. C.; FRANK MULHOLLAND, Tampa, Fla.; FRANKLIN PEW, Three Rivers, Mich.; JOHN DAVIS, Erie, Pa.; HOWARD W. BOWEN, Charlottesville, Va.; DONALD HAMILTON, Fort Wayne, Ind.; CHARLES LOWE, Santa Monica, Calif.; V. B. MUSSELMAN, Lincoln, Neb.; RICHARD HUNT, Blair, Neb.; JAMES M. KIRBY, Hood River, Ore.; JOHN H. NELMS, Brownwood, Texas; P. D. VANDERBENT, Des Plaines, Ill.; LOUIS HANKINSON, Beaverton, Ore.; SAM O. SISSONS, Everett, Wash.; FOURTH ROW (Back) — WARREN SHAW, Tampa, Fla.; CARROLL WIVEL, Madison, Wisc.; D. G. PRIGMORE, Muskegon, Mich.; GEORGE WIRTZ, Madison, Wisc.; HIDEYA KUMATA, Assoc. Prof., Michigan State University, (Communicating Engineering Decisions); JOE COFFMAN, New York, N. Y.; ANATOLE GRUEHR, Brooklyn 1, N. Y.; JAMES HENDRY, Assoc. Prof., Michigan State University, (Fundamental Economic Concepts); J. B. FLOWERS, Texarkana, Texas; F. A. ELROD, San Angelo, Texas; MAYNARD BROWN, Bloomington, Ill.; B. G. WALKER, Belvidere, Ill.; HERMAN S. L. HU, Honolulu, Hawaii

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From one end of the U.S.A. mainland to the other, from Hawaii to Alaska to Puerto Rico, the Independent telephone companies are vitally integrated into the American network of communications. Under the banner of the USITA, these far-flung Independents are doing a truly dedicated job of meeting the needs of subscribers. The service they give is unstinted. The equipment they provide is the finest.

This is not to be construed as a product endorsement by United States Independent Telephone Association.

Left:
Sherron stainless steel multiple booths

Below:
Restaurant spanning Illinois Toll Road

A noteworthy example of the enterprise and service-mindedness of the Independents is the Middle States Telephone Company. This Illinois company recently completed a multiple-group installation in the Des Plaines Oasis of the Illinois Toll Road. Middle States Telephone Company chose Sherron stainless steel booths for this project. This company's aim to provide the most satisfactory equipment made this choice inevitable.

as established by MIDDLE STATES TELEPHONE COMPANY

SEE OUR CATALOG IN SWEET'S — INDEPENDENT — Sherron ACOUSTIC V SEE-THRU STEEL—STAINLESS STEEL OUTDOOR AND INDOOR TELEPHONE BOOTHS

There's a Sherron booth for every location and budget in either zinc coated or stainless steel

SHERRON METALLIC CORP., 1201 FLUSHING AVE., BROOKLYN 37, N. Y.

INDUSTRY VIEWS

Classroom photo, taken during USITA's 1961 Management Development Program at the University of Kansas, Lawrence, shows: SEATED (l. to r.): FRANCIS MEDEIROS, Hawaiian Tel. Co., Honolulu, Hawaii; DONALD W. PEARSON, Rochester Tel. Corp., Rochester, N. Y.; CHARLES BAUGH, General Tel. Co. of Ky., Lexington, Ky.; HAROLD P. MISHLER, General Tel. Co. of Pa., Erie, Pa.; FRED E. CUNNINGHAM, General Tel. Co. of Pa., Johnstown, Pa.; JOHN G. SIEMONS, The United Tel. Co. of Pa., Harrisburg, Pa.; ROBERT FIELDS, Southeastern Tel. Co., Fort Walton Beach, Fla.; RUSSELL P. HULBERT, The Winter Park Tel. Co., Winter Park, Fla.; FLOYD McKEIGHEN, California Water & Tel. Co., Monrovia, Calif.; HOWARD R. WOODBURN, Oregon Washington Tel. Co., Hood River, Ore.; WILLIAM P. ESSLINGER, The Southwestern States Tel Co., Brownwood, Texas. STANDING: PHILIP B. HARTLEY, University of Kansas, Lawrence, Kans.

Members of this USITA Management Development Program Class are: SEATED (l. to r.): HOWARD M. KEEN, General Tel. Co. of Fla., Lakeland, Fla.; DON L. SCHUMACHER, General Tel. Co. of Wisc., Madison, Wisc.; FRANCIS W. VINALL, West Coast Tel. Co., Everett, Wash.; CHARLES ESKRICH, Middle States Tel. Co. of Ill., Park Ridge, Ill.; HARVEY J. HASKELL, La Crosse Tel. Corp., La Crosse, Wisc.; BAXTER H. CASE, The Elyria Tel. Co., Elyria, Ohio; JOE COLLYNS, General Tel. Co. of the Southwest, San Angelo, Texas; JOHN HERDT, Jr., United Tel. Co. of Mo., Kansas City, Mo.; ROBERT LAMBERTON, General Tel. Co. of Calif., Santa Barbara, Calif.; FREDERIC HACQUEBORD, California Water & Tel. Co., Monrovia, Calif.; ROBERT BESWICK, The Geneva Tel. Co., Geneva, Ohio. STANDING: BERTRAM L. TRILLICH, University of Kansas, Lawrence, Kans.

Participants in this session of the 1961 USITA Management Development Program are: SEATED (l. to r.): GEORGE STURTZ, General Tel. Co. of Ohio, Marion, Ohio; ROBERT E. WARD, General Tel. Co. of Calif., Santa Monica, Calif.; WILLIAM F. WALKER, The Peoples Tel. Corp., Butler, Pa.; DAVID ANDERSON, General Tel. Co. of Wisc., Black River Falls, Wisc.; ROBERT TOWNSEND, Central Tel. Co., Hickory, N. C.; RICHARD A. LAMER, General Tel. Co. of Ill., Bloomington, Ill.; RICHARD STEARNES, General Tel Co. of Ohio, Marion, Ohio; JOHN A. QUINCY, New York Tel. Co., Albany, N. Y.; JOSEPH A. HILL, Rochester Tel. Corp., Rochester, N. Y.; WINFRED R. CORNELIUS, The Southwestern States Tel. Co., Brownwood, Texas. STANDING: RONALD R. OLSEN, University of Kansas, Lawrence, Kans.

Coffee break at 1961 USITA Management Development Program is enjoyed by: FIRST ROW, SEATED (l. to r.): JOE COLLYNS, San Angelo, Texas; HOWARD R. WOODBURN, Hood River, Ore.; CHARLES ESKRICH, Park Ridge, Ill.; HOWARD M. KEEN, Lakeland, Fla.; J. B. SWINK, Corsicana, Texas; JOHN G. SIEMONS, Harrisburg, Pa.; FRED E. CUNNINGHAM, Johnstown, Pa.; WINFRED R. CORNELIUS, Brownwood, Texas; RUSSELL P. HULBERT, Winter Park, Fla.; FREDERIC HACQUEBORD, Monrovia, Calif.; DON L. SCHUMACHER, Madison, Wisc.; SECOND ROW, STANDING: BAXTER H. CASE, Elyria, Ohio; ROBERT LAMBERTON, Santa Barbara, Calif.; CHARLES BAUGH, Lexington, Ky.; BERTRAM L. TRILLICH, Lawrence, Kans.; RICHARD A. LAMER, Bloomington, Ill.; DAVID ANDERSON, Black River Falls, Wisc.; FRANCIS W. VINALL, Everett, Wash.; ROBERT FIELDS, Fort Walton Beach, Fla.; EDWARD C. GARNETT, Jr., Lexington, Va.; DONALD W. PEARSON, Rochester, N. Y.; FRANCIS MEDEIROS, Honolulu, Hawaii; GERALD RICHWINE, Fort Wayne, Ind.; HAROLD P. MISHLER, Erie, Pa.; WILLIAM F. WALKER, Butler, Pa.; JOSEPH A. HILL, Rochester, N Y. THIRD ROW, STANDING: JOHN A. QUINCY, Albany, N. Y.; RONALD R. OLSEN, Lawrence, Kans.; PHILIP B. HARTLEY, Lawrence, Kans.; ROGER L. SINGLETON, Lawrence, Kans.; JOHN HERDT, Jr., Kansas City, Mo.; WILLIAM P. ESSLINGER, Brownwood, Texas; GEORGE STURTZ, Marion, Ohio; ROBERT TOWNSEND, Hickory, N. C.; HARVEY J. HASKELL, La Crosse, Wisc.; FLOYD McKEIGHEN, Monrovia, Calif.; ROBERT E. WARD, Santa Monica, Calif.; W. CARL ALLEN, Rantoul, Ill.; THEODORE WOZNY, Columbia, Mo.; THOMAS E. MILLER, Lawrence, Kans.; and ROBERT BESWICK, Geneva, Ohio.

Students and faculty members participating in the 1961 USITA Management Development Program at the University of Kansas, Lawrence, July 16-August 11: FIRST ROW (l. to r.): HOWARD R. WOODBURN, Oregon Washington Tel. Co., Hood River, Ore.; WINFRED R. CORNELIUS, The Southwestern States Tel. Co., Brownwood, Texas; RONALD R. OLSEN, University of Kansas, Lawrence, Kans.; FRANCIS MEDEIROS, Hawaiian Tel. Co., Honolulu, Hawaii; W. CARL ALLEN, Eastern Illinois Tel. Co., Rantoul, Ill.; ROBERT A. FIELDS, Southeastern Tel. Co., Fort Walton Beach, Fla.; JOHN HERDT, Jr., United Tel. Co. of Mo., Kansas City, Mo.; HOWARD M. KEEN, General Tel. Co. of Fla., Lakeland, Fla.; JOHN G. SIEMONS, The United Tel. Co. of Pa., Harrisburg, Pa. SECOND ROW: RICHARD STEARNES, General Tel. Co. of Ohio, Marion, Ohio; ROBERT TOWNSEND, Central Tel. Co., Hickory N. C.; BERTRAM L. TRILLICH, University of Kansas, Lawrence, Kans.; DONALD W. PEARSON, Rochester Tel. Corp., Rochester, N. Y.; DON L. SCHUMACHER, General Tel. Co. of Wisc., Madison, Wisc.; FRED E. CUNNINGHAM, General Tel. Co. of Pa., Johnstown, Pa.; JOHN A. QUINCY, New York Tel. Co., Albany, N. Y.; GEORGE STURTZ, General Tel. Co. of Ohio, Marion, Ohio; THOMAS E. MILLER, University of Kansas, Lawrence, Kans.; ROBERT E. WARD, General Tel. Co. of Calif., Santa Monica, Calif.; DAVID ANDERSON, General Tel. Co. of Black River Falls, Wisc.; CHARLES BAUGH, General Tel. Co. of Ky., Lexington, Ky. THIRD ROW: FREDERIC HACQUEBORD, California Water & Tel. Co., Monrovia, Calif.; BAXTER H. CASE, The Elyria Tel. Co., Elyria, Ohio; FLOYD McKEIGHEN, California Water & Tel. Co., Monrovia, Calif.; EDWARD C. GARNETT, Jr., Lexington Tel. Co., Lexington, Va.; HARVEY J. HASKELL, La Crosse Tel. Corp., La Crosse, Wisc.; JOSEPH A. HILL, Rochester Tel. Corp., Rochester, N. Y.; J. B. SWINK, Texas Tel. & Tel. Co., Corsicana, Texas; RUSSELL P. HULBERT, The Winter Park Tel. Co., Winter Park, Fla.; THEODORE WOZNY, General Tel. Co. of Mo., Columbia, Mo.; HAROLD P. MISHLER, General Tel. Co. of Pa., Erie Pa.; CHARLES ESKRICH, Middle States Tel. Co. of Ill., Park Ridge, Ill. FOURTH ROW: WILLIAM P. ESSLINGER, The Southwestern States Tel. Co., Brownwood, Texas; FRANCIS W. VINALL, West Coast Tel. Co., Everett, Wash.; GERALD RICHWINE, General Tel. Co. of Ind., Inc., Fort Wayne, Ind.; RICHARD A. LAMER, General Tel. Co. of Ill., Bloomington, Ill.; WILLIAM F. WALKER, The Peoples Tel. Corp., Butler, Pa.; ROBERT BESWICK, The Geneva Tel. Co., Geneva, Ohio; ROBERT LAMBERTON, General Tel. Co. of Calif., Santa Barbara, Calif.; JOE COLLYNS, General Tel. Co. of the Southwest, San Angelo, Texas; PHILIP B. HARTLEY, University of Kansas, Lawrence, Kans. Administration not pictured: James R. Surface, director, The University of Kansas, and Roger L. Singleton, assistant director, The University of Kansas.

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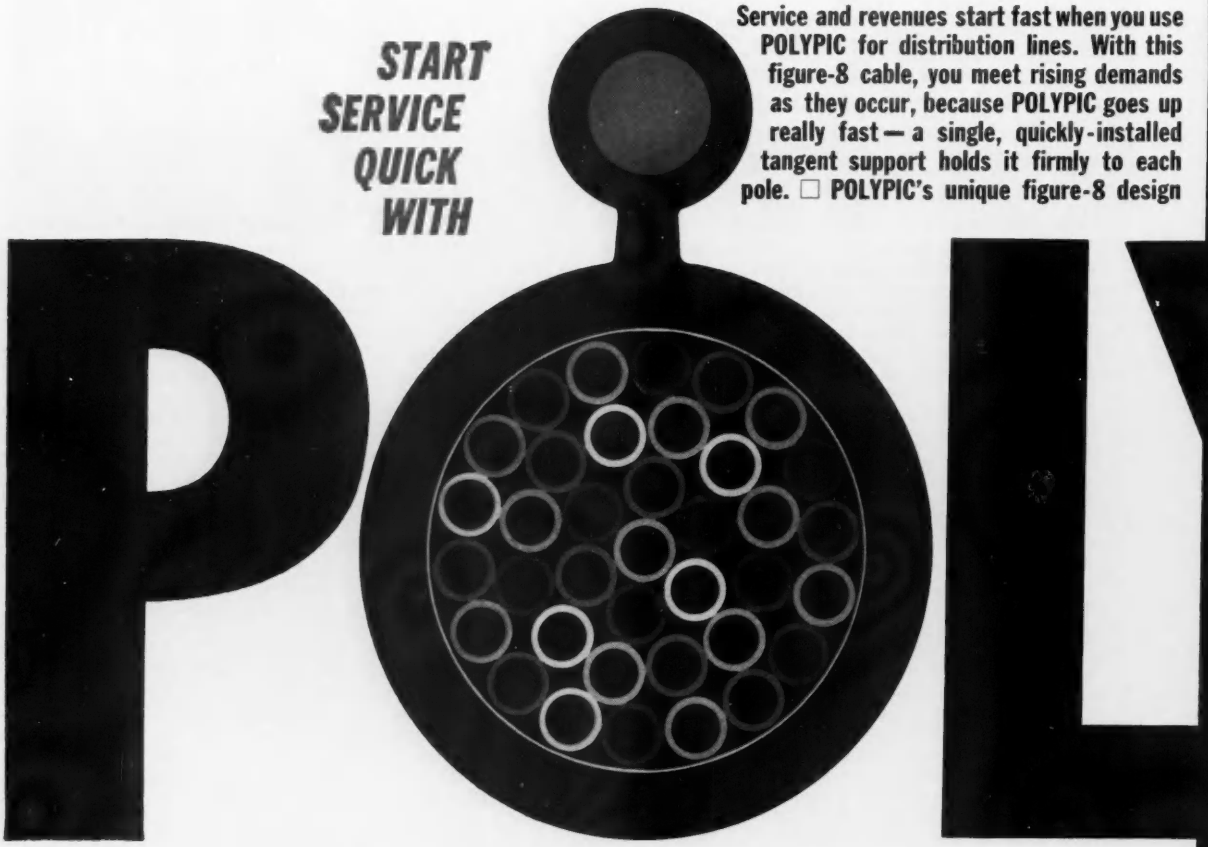
SERVICE
QUICK
WITH



Service and revenues start fast when you use POLYPIC for distribution lines. With this figure-8 cable, you meet rising demands as they occur, because POLYPIC goes up really fast — a single, quickly-installed tangent support holds it firmly to each pole. □ POLYPIC's unique figure-8 design

improves transmission over former RD cable because of lower variations of mutual capacitance between wet and dry conditions. And its high molecular weight polyethylene jacket, over both messenger and cable, gives excellent mechanical protection and long service life. ☐ Get details on POLYPIC from your distributor, or write General Cable Corp., 730 Third Avenue, New York 17, New York ☐ Distributed by: Automatic Electric Sales Corporation, Northlake, Illinois; Leich Sales Corporation, 427 West Randolph Street, Chicago 6, Illinois

GCC
GENERAL CABLE CORPORATION

YPIC

INDUSTRY OBSERVATIONS

By L. A. GRITTEN

Why The Lag?

IN 1918, Alexander Graham Bell, having revolutionized the world's communications, turned his inventive genius to marine transportation. At his home in Novia Scotia, he and K. C. "Casey" Baldwin, following a suggestion by an Italian engineer, built a hydrofoil powerboat in which they skimmed over the waves at 60 miles an hour.

There the idea stayed—in America. But in Europe six countries have developed hydrofoils and put them into profitable commercial operation. The country with the most and the best of them is—you guessed it—Russia.

Here, at last, after 43 years, an American syndicate is building a hydrofoil that is designed to carry 70 passengers at 60 knots or better.

The Worst Shame

EIGHTY YEARS AGO, Helen H. Jackson wrote "Century of Dishonor," decrying the shameful treatment the Indians had suffered at our hands. If only she could have lived to see this:

We are in a Montana "tourist trap," one of those hotels that try so hard to convert the lovely loneliness of the Rocky Mountains into another Coney Island. One of the showpieces is a Blackfeet Indian, dressed in fringed leather, eagle feathers and beading, the attire that was traditionally reserved by his tribe for ceremonial occasions. He subsists on tips from guests who photograph him. His bellicose grandfathers would have scalped him and the guests as well, in sheer disgust at such sacrilege.

A few yards behind this descendant of warriors, they are selling "Indian" beadwork belts. They seem to be more genuine than the poor old Indian—until one reads on the reverse side: "Made in Hong Kong."

Samuel Blinn vs. Socialism

MOST OF US believe in free enterprise, the American conception of personal liberty, and all that. But if our own personal freedoms are attacked by the socialistic agents of our government, what happens? Most of us conform, put up, pay up—and talk.

Samuel Blinn, in Grant County, Ind., takes his freedom more seriously. He refused to conform. The Agricultural Stabilization & Conservation Committee charged Blinn with the heinous crime of growing one-fifth of an acre too much wheat in 1957. They fined him $475.24.

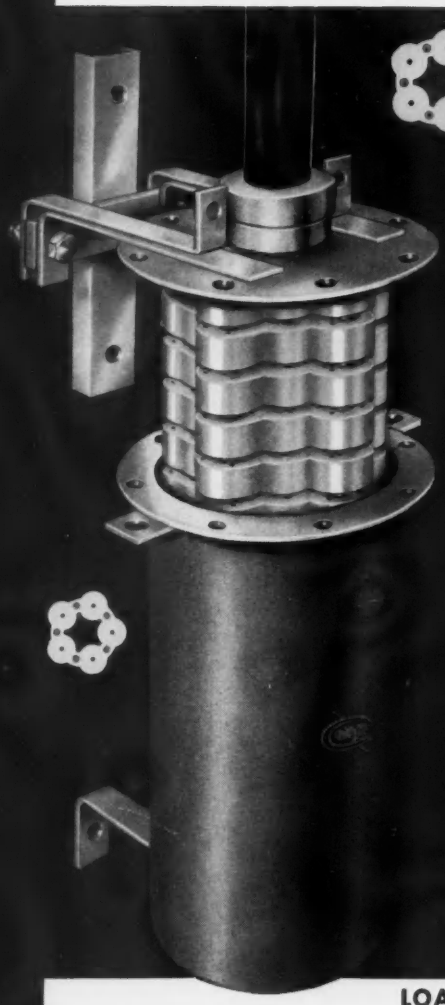
Blinn fought back in the Courts—and he won. His legal costs amounted to $1500; so financially his resistance cost him $1025. But if all of us who believe in freedom were to fight for it every step of the way, and accept the risks, we should have less socialism, less government and more of the old freedoms we like to talk about.

Creeping Socialism

EDWARD R. MURROW earned the gratitude of millions for television programs that were above the average in interest and intelligence. As director of the U.S. Information Agency, he has broken ground in a different and more questionable direction.

Before the House Science and Astronautics Committee, he proposed that government agencies "having

It's Expansible!



THE COOK

EXPANDABLE COIL CASE

with 88 mh or 44 mh LOADING COILS

LOADING COIL ELECTRICAL PROPERTIES

Type of Coil	CHARACTERISTICS							
	Nominal Inductance (MH)	Inductance Unbalance (%) Maximum	D.C. Resistance (Ohms) Maximum	D.C. Resistance Unbalance (Ohms) Maximum	Effective Resistance (Ohms) Maximum	Dielectric Strength Between Winding (D.C. Volts) Minimum	Insulation Resistance (Megohms) Minimum	Cross Talk Loss Between Adjacent Coils (Decibles)
613-344	44	.5	5.4	.2	7.1	10,000	10,000	90 or Greater
614-343	88	.5	9.0	.2	11.0	10,000	10,000	90 or Greater

COOK ELECTRIC Company

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. . . Measures absolute amplitude and relative delay characteristics of 600 ohm transmission circuits from 200 cycles to 24 kc. Temperature range 32°F to 130°F with 60 cycle line voltages from 105 to 125 volts. Overall precision and accuracy ±50 microseconds. Drift rate not exceeding ±50 microseconds per 30 minutes.

SPECIFICATIONS OF THE 451-A TRANSMITTER

CARRIER SWEEP RATE: Carrier frequency controlled manually or by a motor driven sweep capacitor at two sweep rates:
a. 1 cycle per 10 seconds, or 6 rpm.
b. 1 cycle per 100 seconds, or .6 rpm.

CARRIER FREQUENCY: Continuously adjustable from 200 cycles to 12 kc. The sweep width and position is adjustable within the 200 cycle-12 kc. limits. The minimum sweep width is 1500 cycles. An external oscillator can be used up to 24 kc.

REFERENCE FREQUENCY: Means are provided for switching the carrier frequency (normally controlled by the sweep capacitor) to a reference frequency anywhere in the 200 cycle to 12 kc. band.

MODULATION FREQUENCY: 25 cycles, derived through counting circuits from tuning fork control oscillator. 2 kc. tuning fork stability ±3 ppm at room temperature.

FREQUENCY METER: Carrier frequency continuously indicated on a direct-reading meter with an error not exceeding ±2.5% of full scale. Frequency meter calibration can be checked by inserting a 2 kc. signal from the local fork oscillator circuit.

TRANSMITTER OUTPUT SIGNAL: Output level adjustable in 5 db steps from −20 dbm to +10 dbm. These figures represent the peak power in the 50% modulated output signal applied to the output terminals. Maintains internal impedance of 600 ohms ±10 ohms from 200 cycles to 24 kc. The frequency characteristic of the output terminals is flat to within ± .25 dbm from 200 cycles to 24 kc.

TRANSMITTER SYNC. OUTPUT: 2 kc. signal can be used as a common time base in both the transmitter and receiver.

SPECIFICATIONS OF THE 452-A RECEIVER

INPUT IMPEDANCE: Internal impedance is 600 ohms ±10 ohms from 200 cycles to 24 kc.

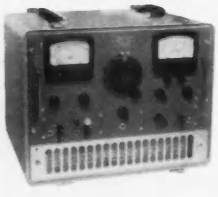
INPUT LEVEL: The receiver will perform satisfactorily over the range from +10 dbm to at least −30 dbm by use of the manual attenuator control and operate over any 20 dbm range within the specified limits without change in the attenuator control. The input-level is indicated algebraically by an input attenuator calibrated in dbm and level meter calibrated in dbm. The meter range is 20 dbm; the attenuator range is 25 dbm in 2.5 db steps. All readings are peak input power to the receiver.

DELAY MEASUREMENTS: Delay is indicated on a relative basis, reference being to a cardinal point in the frequency band between 200 cycles and 24 kc. Measurements are obtained from a direct-reading meter which has two sensitivities: 2 ms and 20 ms full scale. The 0 to 2 ms range may be positioned anywhere in the 0 to 20 ms scale by means of a coarse control which adds or subtracts precise 500 microsecond increments of delay in the reference channel. A fine control is provided to obtain cardinal point adjustment.

FREQUENCY METER: Same as Transmitter.

AMPLITUDE TO PHASE CONVERSION: With a 20 db change in amplitude, the output delay indication will not change by more than ±50 microseconds.

TYPE 453-A COMPACT MEASURING SET



Measures Attentuation and Relative Delay Characteristics of Transmission Systems with Impedance of 600 ohms.
Carrier frequency Range 500 cps to 50 kc. Accuracy − ± 5 microseconds.
Delay is measured by comparing the time relationship between the transmitted and received signals.
MODULATION FREQUENCY: 62.5 cps derived through frequency dividing circuits from a tuning fork controlled oscillator.
TRANSMITTER OUTPUT: Two output levels 0 dbm and −4 dbm. floating and balanced. Output impedance 600 ohms ± 30 ohms over range 500 cps to 50 kc. Frequency characteristics of output signal flat to ± .5 db.
RECEIVER INPUT: Balanced and floating with an input impedance of 600 ohms ± 20 ohms from 500 cps to 50 kc.
DELAY MEASUREMENTS: Indicated on a relative basis. Always read on the 0 to 0.2 M.S. full scale range. Coarse and Fine Delay switches and Fine Phase Control for precise adjustments.

TIC

TECHNOLOGY INSTRUMENT CORP.
533 MAIN STREET, ACTON, MASSACHUSETTS
8530 WILSHIRE BOULEVARD, BEVERLY HILLS, CALIFORNIA

contributed to developing the system [Space Communication] should not be put on a parity of payment with other customers," but that there should be " a preferred position for government agencies." His suggestion was well received.

Apparently he feels that government agencies, in assisting the development of space communication, use money that in some way is peculiarly and privately their own, as distinct from the expenditures of private corporations for the same general purpose.

Actually, every cent of the cost of their "contributions" comes from the taxation of private corporations, their shareholders and the general public.

Any such preference to government agencies would merely invite more governmental waste and more "vote catching" at the public expense. The more they are given, the more they waste.

U. S. E. Gestation?

WHEN PRIME MINISTER Harold Macmillan announced Great Britain's determination to enter the European Economic Community, the old dream of a united Europe came closer to reality. With its preferential tariffs and political concentration, this may face our country with the strongest commercial competition we have ever known. On the other hand, we shall gain powerful allies in our fight against the Soviet variety of communism.

Its relation to our business? The 13 countries that may initiate a United States of Europe now have an aggregate population of some 262 millions. They have something over 30,500,000 telephones, of which 85 per cent are owned and operated by government.

Their low average fill (fewer than 12 telephones per 100 population, compared to the U.S.A.'s 39.5) may suggest happy hunting for American manufacturers and salesmen. But British, Swedish and German manufacturers, with the tariff walls of a united Europe to help them, may make the going very rough.

LOW-COST, LONG-LIFE PROTECTION

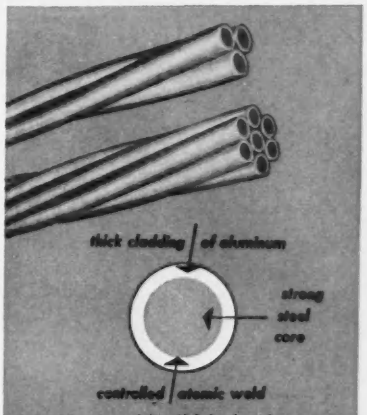
for your overhead lines

Alumoweld Guy and Messenger Strand is designed to last as long as the pole it guys or the cable it supports. Each wire of this low-cost strand has a *thick* aluminum covering applied to the strong steel core by the controlled atomic-welding process. This unique method of manufacture gives Alumoweld the same permanent protection against corrosion as solid aluminum wire.

The rugged strength of Alumoweld is the same as steel, yet Alumoweld weighs 18% less and lasts far longer. It's easy to handle, easy to install.

Supplies of Alumoweld Strand are available for prompt shipment from our warehouses in New York, Chicago, Pittsburgh and Memphis.

For the complete story on Alumoweld, write for Engineering Bulletin E.D. 3000.



Alumoweld's *thick* aluminum covering—25% by area—will not crack, flake or peel. It is inseparably interlocked with the high-strength steel core by a ductile weld that remains permanent under all operating conditions.

COPPERWELD STEEL COMPANY

WIRE AND CABLE DIVISION Glassport, Pa.

For Export: COPPERWELD STEEL INTERNATIONAL COMPANY, New York

Canadian Distributor: NORTHERN ELECTRIC COMPANY LIMITED

TELEPHONE

ALCOA OUTDOOR BOOTHS SAY "CALL RIGHT NOW," AND MORE PEOPLE DO!

In Florence, Kentucky, Consolidated Telephone Company reports:

"*All* our outdoor booths are aluminum . . . most of them Alcoa's!" says Mr. G. B. Foscue, president of Consolidated Telephone Company, Florence, Ky. "We believe we have increased revenue by installing outdoor aluminum booths, and we get many favorable comments regarding their appearance and convenience. Vandalism is no worry, either.

"We have no maintenance problems with Alcoa Aluminum booths," Mr. Foscue states. "Easy to clean and there's plenty of room, good lighting and we like the attractive appearance."

Mr. Foscue is but one of many independent telephone company officers who find solidly built Alcoa® Aluminum outdoor booths resist wear and tear. Alumilite* finish stays bright and clean. Aluminum won't rust . . . defies corrosion. Doors don't stick or warp out of shape, even after years of constant use—thanks to sturdy Alcoa Aluminum Extrusions.

For more information about Alcoa outdoor booths—and the new Alcoa "compact" booth—call your telephone supply jobber. Or write: Aluminum Company of America, 1781-W Alcoa Building, Pittsburgh 19, Pa.

World-wide sales through Alcoa International, Inc., 230 Park Avenue, New York 17, N. Y.

*Trade Name of Aluminum Company of America

ALCOA ALUMINUM

ALUMINUM COMPANY OF AMERICA

For exciting drama watch "Alcoa Presents" every Tuesday evening—ABC-TV

AE has the right equipment for your direct burial installation

What do you need for economical, easy-maintenance burial? Do you need a cable that handles easily, installs quickly? *AE's got it* in General Cable DS Qualpeth. It's specially engineered for fine underground transmission.

Need the economy of polyethylene construction in distribution wire? *AE's got it* in Alphaduct armored wire.

Need sturdy housings with easy access to terminals? *AE's got 'em!* Need loading coils that insure noiseless transmission? Bright warning signs to prevent digging up of your cable? *AE's got 'em!*

To get any or all of these essential buried-plant products, just contact one man—your AE representative. He'll give you full details on all of them.

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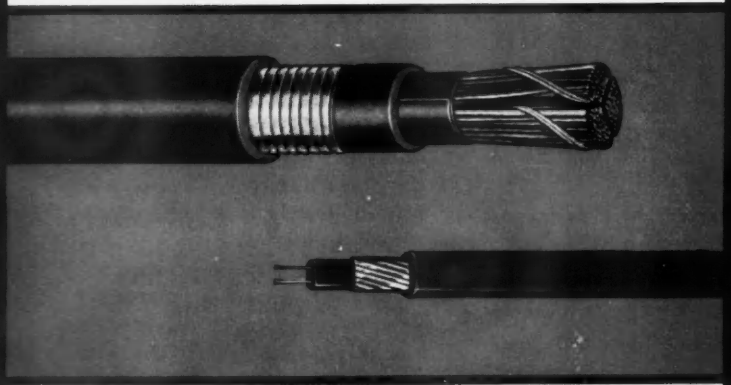
AE TYPE 60 LOADING COILS. High-voltage coils for use with today's plastic cables. Order them singly or in assemblies of 3, 6, 12, 18, 25 or more coils. U-shaped clips snap on to assemblies to make installation quick and easy.

TERMINALS give easy access to all cable pairs for testing, splicing, loading, protection, cross-connecting and wire distribution. All steel housing. Pedestal type or pole-mounted models. Sizes to accomodate 6 to 400-pair cable.



DS QUALPETH by General Cable. Double polyethylene, plastic-insulated cable gives you extra protection. Choice of aluminum or copper shielding. In conductor sizes 26, 24, 22, and 19 AWG. From 6 to 400 pairs.

ALPHADUCT ARMORED UNDERGROUND DISTRIBUTION WIRE. Available with extra-rugged rubber insulation and neoprene jacket, or with economical polyethylene insulation and jacket. Both types have flat steel ribbons wrapped around insulated conductors.

WARNING SIGNS in eye-arresting yellow field with red and black letters. Gives visible location of cable route, provides protection against digging or trenching. Heavy gauge steel frame. Post is plastic coated to resist corrosion.

SEND YOUR PROBLEMS TO TE&M

A glance through the mail received daily at TE&M's office is enough to prove that readers all over the world bring their problems and questions to TE&M. And we're happy they do. Believing that the questions and problems presented by TE&M readers, and the answers prepared by TE&M's editors, will be of interest and value to all readers, we have developed this TE&M feature, and we hope you will use it whenever you need a fast correct answer to a question, or a solution to some operating problem. Send your questions to: *Editor, TE&M, 7720 Sheridan Rd., Chicago 26, Ill.*

QUESTION:—*A recent article in "Telephone Engineer & Management," illustrated the use of bank-contact cleaning equipment. I would appreciate information on the method shown.*

ANSWER:—The bank contact cleaning equipment consists of a rotor mounted on a handle, a flushing unit, a wiper cleaner, and a filter can, and a washing solvent. The rotor is composed of nylon flexible disks held together by a hollow spindle. The flushing unit flushes out foreign matter accumulated on the nylon disks in the cleaning operation and applies washing fluid to the disks. The rotor disks will clean five contact levels of the bank at one time. The disks are rolled across the contacts with just enough pressure toward the banks to keep the disks between the bank levels and to make sure that they contact the full length of the bank contacts. After several passes, the nylon disks are cleaned in the flushing unit.

The bank cleaning equipment and instructions for its use can be obtained from the *Century Tool Co. (Cont. Div.)* 1051 *Magnolia Ave. Dept. TE&M, Camden, N. J.*

QUESTION:—*We have been experiencing considerable trouble with ladders wearing and splintering while being carried in racks on trucks. Is there any way to protect them? We have tried paint, varnish and preservative solutions but they all seem to wear just as bad.*

"It's amazing Charlie . . . I'll never understand how you do it!"

ANSWER:—Painting is not recommended as it tends to conceal defects and is forbidden in at least one state. Oil and varnish combinations have been recommended in the past but some companies complain that they do not provide sufficient protection from the rubbing action resulting from vibration in a carrying rack. The use of preservative treatment is the latest wrinkle but still this treatment will not prevent the abrading effect on the ladders.

A ladder manufacturer has recently introduced a plastic covering that may be applied to the side rails of ladders. The covering adheres firmly to the wood and will stand the wear better than the wood alone. If the covering is damaged in any way, the damaged portion can be replaced with a plastic section. I recommend that you look into the use of the plastic covering on your ladders.

QUESTION:—*What is your opinion of the grounding of portable electrical tools? Because of labor saving features, we have been making more and more use of such tools in our work and we are concerned about possible shock hazards to our personnel.*

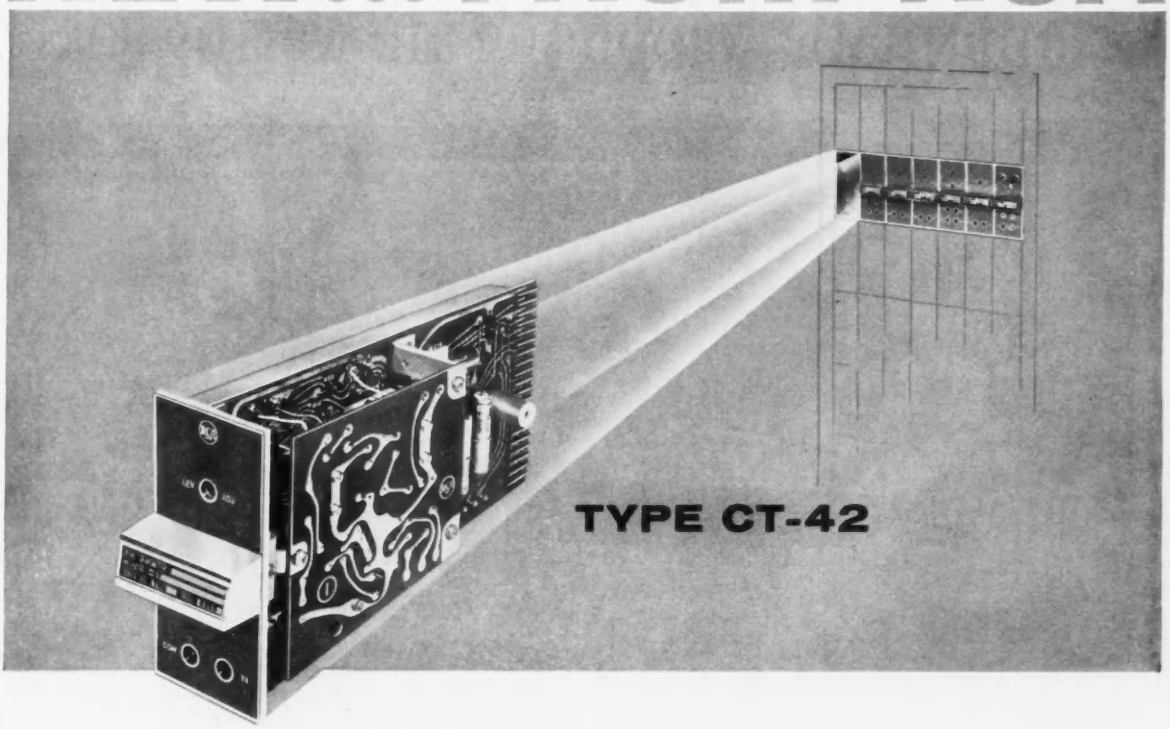
ANSWER:—The grounding of portable electrical tools will depend on source of electric power. If you are using ungrounded portable electric generators, it is not necessary to ground the frame of the tools. Also, it is not necessary to ground trouble lamps and soldering irons whether they are operated from commercial power circuits or from portable generators.

However, portable electric drills, hammers, saws, and other tools that are held in the hand should be grounded if they are used on commercial power circuits. You will find that most electric portable tools are provided with a third wire that connects to the frame of the tool. This third wire should be connected to the ground by means of a three-prong plug or directly to a water pipe or grounded electrical conduit.

Even when a power-operated tool is properly grounded, precautions must be observed in handling the tool in wet locations. If the operator should stand in water and drop the tool in the water, he will receive a severe shock as the current will spread in the water from connections in the tool, even though the tool frame has been grounded. In such situations, it is safer not to use electric-operated tools.

Need Help? ? Who doesn't? ? Well, before the solution to a tough operating problem, or the answer to a question, has you talking to yourself, send the troublemaker to TE&M. We'll do our best to come up with the right answer.

NEW... FROM RCA



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FOR WIRELINE, MICROWAVE OR CARRIER

24 channels from 420 to 3180 cps—Spaced every 120 cycles (CCITT Standards)
18 channels from 4300 to 7600 cps—Spaced 170 to 220 cycles

The CT-42 is an all new tone multiplex of high performance designed to operate over a wide environmental range. Ruggedly built, it uses computer grade components for lasting dependability.

Each channel can be frequency-shift or AM keyed for teletype, telemetering, control or data signals. Six transmitters or receivers in any combination may be plugged into a standard shelf which also contains a husky regulated power supply.

Channel units operate from 24 V DC or 117 V AC power supply.

If you are looking for the newest and best in tone multiplex equipment, mail the convenient coupon for complete specifications and prices.

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☐ Please send new catalog sheet and price list on Type CT-42 Tone Equipment.

NAME_____ TITLE_____
COMPANY_____
ADDRESS_____
CITY_____ ZONE_____ STATE_____

REALTORS are "in" to all customers with automatic telephone answering sets

James Pedersen (right), realtor gets instructions from William Spake and Cecil Medling of the phone company.

"I would recommend this Electronic Secretary® set to any prospective subscriber"

JAMES E. PEDERSEN, ***Realtor, Lake Wales, Fla.***

Like all realtors, Mr. Pedersen is away from his office a great deal of the time, looking over property or showing it to prospective purchasers. His ELECTRONIC SECRETARY telephone answering set enables him to record all phone calls received while he is out. One call from a new listing or prospect could pay for the rental of his set for many years.

In a letter to the telephone company, Mr. Pedersen states that although his ELECTRONIC SECRETARY set was just recently installed, he is happy with the success already experienced. He is especially pleased with the simplicity of operation and the ease of recording his own announcement messages.

YOU can increase sales and improve customer relations by having an ELECTRONIC SECRETARY phone answering set installed in YOUR office. The low rental fee is added to the telephone bill and, like the telephone, all service is handled by the phone company at no cost to you.

Ask your telephone company for more details

ELECTRONIC SECRETARY®

Complete line of ELECTRONIC SECRETARY telephone answering sets meet every prospect's needs

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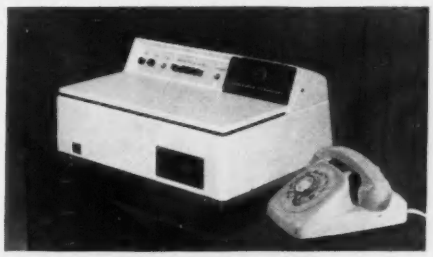
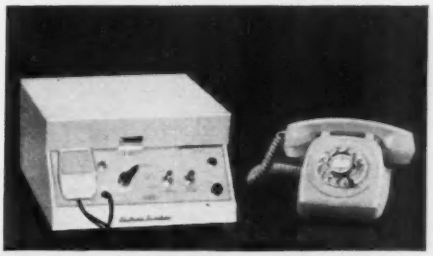


LONG PLAY MODEL

Designed primarily for the company receiving a large number of calls or messages of great length. Answers the phone with an announcement message and receives up to two hours of incoming messages.



SHORT PLAY MODEL

Especially good for the smaller business. Performs the same functions as the Long Play Model but has a more limited capacity.

ANSWER ONLY MODEL

For those who want the advantages of automatic answering but do not need the incoming messages recorded.

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TRUMANSBURG HOME TELEPHONE COMPANY,
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Please send me ..... copies of "The Leich Line Concentrator" catalog which includes typical applications, installation data, principles of operation, and ordering information.

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Subsidiary of
GENERAL TELEPHONE & ELECTRONICS

Exchange Unit for 49-18-3AZ Leich Line Concentrator.
Shown are (left to right) J. Fred Allen, District Manager,
and Mr. W. M. Griswold, President,
Trumansburg (N. Y.) Home Telephone Company.

Mr. Gene Sabin, Central Office Supervisor,
with Line Concentrator Subscriber Unit mounted
in small building.

"Leich's Line Concentrator saved us $8,000 when compared to the alternate cost of cable relief!" reports Mr. W. M. Griswold. "The unit improved service at low cost in two small hamlets about five miles from our central office in Trumansburg, New York."

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The installed cost of the 49-18-3AZ Leich Line Concentrator was only $5,000. Instead of serving each line over a separate wire pair, it concentrates a number of subscriber lines over a much smaller "high usage" trunk group. It used 21 pairs of the existing 51 pair cable to furnish 49 lines—for a net gain of 30 cable pairs!

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Made from acrylic plastic, The PEARL is white in color. Lighting is provided by two fluorescent tubes behind the coin collector. Colored diffusers produce a mellow halo around the phone. Pink tubes with white diffusers are available.

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The PEARL creates impulse calls, steps up profits. Order TODAY.

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• • • •

"Research Job"

"Congressman James F. Battin of Montana says that $89,000 was spent by the Public Health Service during the past year in research and issuing a detailed report on people's behavior at cocktail parties. This should be valuable information which will go a long way in solving the troublesome problems which now confront the United States on every hand. Also, we imagine that Public Health staff members stood in line in applying for this particular 'research' job." — *Fort Worth (Tex.) The Southern Conservative.*

"Federal Grants"

"When grants of federal funds are involved, federal control is inherent, and the U. S. Supreme Court has upheld in this principle . . . It follows, as logically as night follows day, that federal aid to education must sooner or later be followed by federal control." — *West Point (Miss.) Times Leader.*

"Government Economy"

"The politicians love to talk about economy in government, but take a look at some evidence of 'economy' uncovered by the House Armed Services Investigation subcommittee . . . The Navy paid $109,012 for parts that cost the supplier $20,820. Of course, the government recovered 52 per cent of the profit in taxes, but the tax-payers are still the loser.

"In another instance the Air Force purchased 44,352 armatures from an Ohio company for $32.28 each. The Ohio firm bought them from another company for $16.69 each . . . If some of this waste were eliminated the Frontier could really put on a firm front." — *Jefferson (Ohio) Gazette.*

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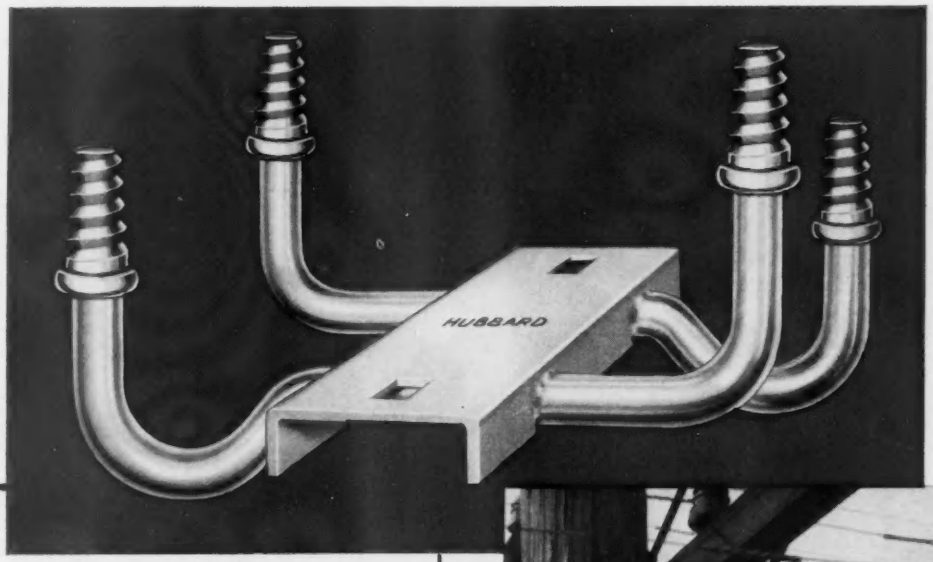

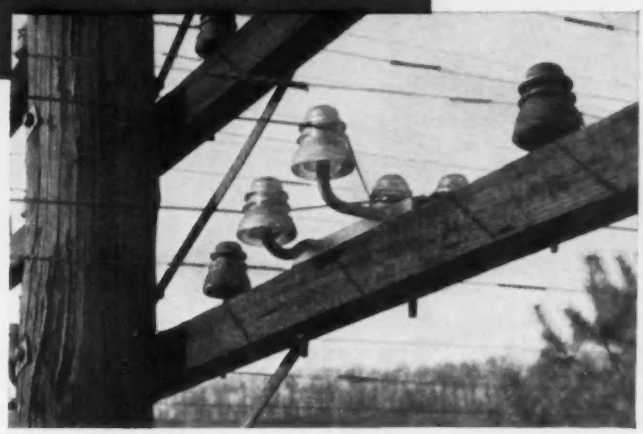

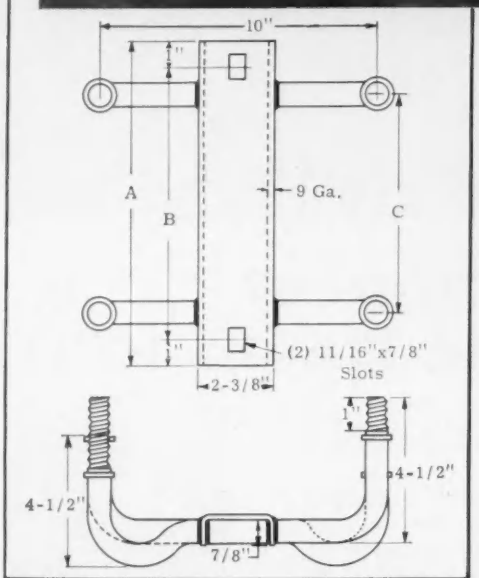

Stock No.	A	B	C	Weight Pounds Per 100 Pieces
9227	12"	10"	8⅜"	550
9228	14"	12"	10⅜"	690
9238	10"	8"	6⅜"	615

This new point-type transposition bracket was developed recently in order to combine maximum strength with minimum weight, thus assuring trouble-free service under the most adverse operating conditions. Although the function of this type bracket remains unchanged, the physical characteristics differ considerably from earlier designs as a result of modern, all welded construction.

This style bracket was designed for spindle threaded insulators and is mounted by means of two ⅝-inch carriage bolts (not included). Crossover clearance is 1-inch.

The point-type transposition bracket is but one of many styles available. Contact your nearest Hubbard representative for further details on this and other designs.

HUBBARD AND COMPANY
CHICAGO 50, ILLINOIS

Cable laying goes compact with new John Deere 1010

The new 40-engine-h.p. John Deere "1010" Crawler with 230A Cable Plow has the long-pull power and fast-handling flexibility to make buried-wire installation pay. Following dirt road grass lines out where it may be a mile between mailboxes, or plowing in drops in a new housing addition, the versatile, low-cost John Deere provides a number of advantages to companies of every size.

With minimum soil displacement, the unit lays multiple pairs of wire, or PIC as large as 1-3/16 inches in diameter, at any depth from 6 to 28 inches. No backfilling is required—cut is compacted by wheels of the line truck or by the tractor treads.

Wire or cable is inserted in the cable guide without cutting, threading, or splicing. Entire cable channel is opened by removal of a locking pin and retaining bar. Roller-equipped guides direct the cable through the plow, for minimum drag.

The John Deere 624 Bulldozer blade supports the reel carrier, or the plow can take its supply directly from a preceding line truck.

The John Deere dealer, listed in your "Yellow Pages" will be pleased to arrange a demonstration for you.

JOHN DEERE

TRACTORS
BACKHOES
CABLE PLOWS
AND
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EDITORIAL

"What Youth Doesn't Know!"

LAST MONTH the National Association of Manufacturers (NAM) did what more organizations should do, more often: Turned its thoughts away from day-to-day business problems, concentrated its attention on the *youth* of this country and *the education they are, or are not, receiving*, and issued a warning that deserves a better fate than burial in a routine news story.

In a style that proved the NAM believes reality has never been successfully dealt with by retreating from it, the NAM warned the nation that 95 *per cent of all high school students entering the work-force of American business do so without any formal education in what makes business tick!*

This amazing statement, based on the results of authoritative polls, is documented by a report proving that each year in the United States, more than 2,000,000 young workers join the business community, and fewer than 5 out of every 100 have been exposed to as much as a one-semester course in economics!

From there the report lists these examples of the nation's failure to teach high school students the facts of economic life:

- 62 per cent of the students thought a worker should *not* produce all he can.
- 76 per cent said most of the gains from new machinery go to the owners.
- 82 per cent believed monoplies are the *rule* in many of America's major industries.
- On matters concerning company operations, profits on the sales dollar (after taxes) were estimated as high as 50 per cent; dividends to stockholders were estimated at 24 per cent and the average capital investment behind each job was figured at $81.

(Correct answers: average profits for all corporations 3 to 6 per cent range; dividends, 3 to 5 per cent range; and it requires an average investment of more than $19,000 to provide a single job in industry today!)

We have always been firm believers in the fact that it is necessary to face the worst before steps can be taken to change it for the better. And certainly, the NAM report should inspire the business leaders of today to ask — (1) *"How can we expect our youths to support free competitive enterprise if they don't know what makes it operate?"* . . . (2) *"How can we spend billions of dollars to sell our way of life among foreign nations when our own young people don't know our economic system?"*

Of course it is not enough to merely ask questions, get answers, and then deplore the lack of economic education available to our youngsters. The business community in every area and in every corner of the nation must attack the problem.

Like the NAM, we regard the lack of economic understanding as both a challenge and an opportunity for every businessman — and we heartily approve the course of action suggested by the NAM that lays on the line a plan for the butcher, the baker, and candlestick maker to do something about it.

In brief, the NAM plan is based on a campaign to impress the state boards of education and the local school boards with the acute need for instituting or broadening economic education courses, particularly in the secondary schools.

For its part, the NAM has prepared a series of authentic economic teaching aids (11 booklets) telling the business story in terms acceptable to educators and understandable to students. They're for classroom use.

We believe it's up to businessmen to join this vital campaign in spreading the free competitive enterprise story among teachers — and thus to students — and we urge our readers to write for further details to *National Association of Manufacturers, Member Relations Division, 2 East 18th St., Dept. TE&M, New York 17, N.Y.*

Certainly, there is much about the NAM plan that makes it deserve the serious consideration of members of the communications industry. In the face of the known failure of our schools to teach high school students the economic facts of life in this country, it seems to us the program suggested by the NAM is itself an absolutely essential instrument of U. S. educational policy.

In our opinion it is imperative that the deficiency of the past not be carried forward to become a deficiency of today and tomorrow. The NAM program suggests one method of preventing such a carry-over. Admittedly, the program, aimed as it is at the students, is not a cure-all. But it is a start in the right direction.

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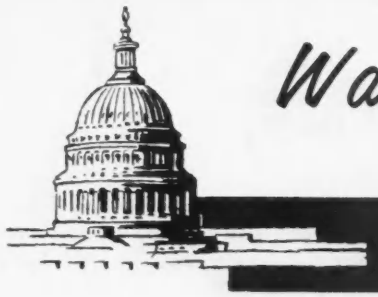

Washington OBSERVATIONS

By ROLAND DAVIES and FRED HENCK

35 members of Congress ask President to defer commitments on ownership of satellite communications system until system is operational . . . FCC makes known decision on AT&T filing on modified Telpak tariff . . . WATS raises legal problems on record keeping, law enforcement.

Ask President to Postpone Action on Satellite Ownership

THIRTY-FIVE MEMBERS of Congress sent a letter to President Kennedy urging that, while the United States should strive to be first to put into active operation a satellite communications system, this should be accomplished "through government research and development contracts."

The legislators recommended "consideration of the question of ultimate ownership of such a system be deferred until the system is fully operational."

The signers asked the President to insure, in event private ownership of the system is finally decided on, that great care is taken to avoid monopolization of its ownership and use.

They said any private enterprise satellite system must give interested U. S. common carriers, domestic and international, equal opportunity to take part, and "afford all interested communications and aerospace manufacturers opportunity to participate in ownership of the system."

The *ad hoc* committee of carriers set up by the FCC will present its plans for a joint venture to the commission on October 13. Chairman Russell Long (D., La.) of the Senate Small Business Monopoly subcommittee has scheduled hearings for October 17.

When the FCC convenes for its first meeting after the Labor Day holiday, it may have ready for decisions another major item dealing with common carrier communications. This is the pending request of the General Telephone & Electronics Corp. that the FCC should reconsider the notice setting up the *ad hoc* committee on a satellite communications system, to provide for membership by domestic as well as international common carriers.

GT&E, answering the *ad hoc* group's request for discussion, pointed out it had the petition for reconsideration pending. The carriers' committee requested the company to participate in meetings scheduled in Washington on September 6-8 "to hear the presentation of a number of invitees and engage in discussions."

The American Telephone & Telegraph Co. and the American Cable & Radio Corp., earlier in filings with the commission, opposed the request of GT&E that the FCC reconsider its supplemental notice of inquiry.

AC&R stated "Although satellites are new, the services which the communications satellites are intended to provide are not new but rather are services . . . provided currently by the existing international communications common carriers by means of plant in which those carriers have very substantial investments and for which they have franchises or licenses."

No reason has been given, AC&R said, which would "in law or equity justify dilution of the existing investment in international communications through admitting to ownership of a new vehicle for international communications persons who have no public responsibility for the rendering of international communications services."

WATS Raises Legal Problems In Law Enforcement, Record Keeping

THE BELL SYSTEM will cooperate fully with law enforcement officials working to curb the interstate transmission of gambling information, but the wide area telephone services (WATS) offering raises legal problems regarding the keeping of records of calls at the request of police officials, a Senate unit has been advised.

The Senate Government Operations Investigations subcommittee began in late August a publicized series of hearings on gambling and other organized crime.

Chairman John L. McClellan (D., Ark.) and AT&T Staff Representative Charles A. Dowd agreed, since the WATS tariff is built around bulk handling of calls by subscribers, some protection would have to be given to a telephone company departing from the tariff offering at the request of law enforcement officials.

Prior to the hearings, the House passed with minor

amendments a bill adopted by the Senate, requiring common carriers to discontinue service on request of a law enforcement authority, but safeguarding carriers against penalty for actions taken in compliance with such requests.

Dowd, working on development of WATS, was preceded as a witness by John B. Montgomery, chief special agent for the Southern Bell Telephone & Telegraph Co. Montgomery told gambling probers his company's role in helping detect a bookmaking operation using long-distance telephone facilities between New York and Miami.

The WATS problem had been brought up earlier in the hearings by Internal Revenue Commissioner Mortimer M. Caplin, who testified principally on the 10-year-old gambling-tax-stamp law's effects. Caplin pointed out it usually is possible to get search warrants based on toll ticket information. In enforcing the law, Caplin said, WATS would complete calls in a way which would not allow IRS to obtain documentary evidence on calls.

Dowd, appearing before the Senate group to explain the WATS tariff offering, said the way Bell System companies handle requests for "important special services such as WATS" makes the "obtaining of service for an illegal business most unlikely."

FCC Faces Bell Deadline On Telpak Channel Decision

THE BELL SYSTEM's Telpak tariff, prominent in communications industry news for much of this year, returned to the spotlight at the beginning of this month and may remain there for some time.

The Federal Communications Commission, which already has handed down major rulings on Telpak without disposing of pending requests for an investigation and hearing, had another one on the fire for its first meeting after the Labor Day holiday and the customary August recess.

Latest deadline faced by the FCC was the September 8 effective date stipulated by the American Telephone & Telegraph Co. for a modified Telpak tariff. This deals with the crux of the controversy—whether the high volume, low-unit-cost Telpak service may be furnished over a variety of diverse facilities or must be centered in single, "discrete" broadband channels.

The modified tariff would permit the AT&T Long Lines Department to furnish Telpak by "whatever facilities the company may find most appropriate." Long Lines pointed out that in previous rulings the FCC has interpreted the Telpak tariff filed in January and effective since mid-February "as requiring that Telpak rates be applied only where the facilities are furnished by means of discrete broadband channels."

There was felt to be considerable possibility the FCC would suspend the tariff changes. This is in view of its past statements that the thing which distinguishes the Telpak filing from other private line services and makes it a separate service classification is the derivation of service channels from a broadband "electronic highway."

AT&T pointed out in announcing the filing of the tariff modification that its "intent in the (original) tariff was to describe the service offered and not the facilities with which it would be furnished, in line with long established communications tariff procedures.

"The modification . . . is designed to eliminate any possible misunderstanding as to how the service will be furnished, and to allow AT&T to furnish Telpak by whatever facilities the company may find most appropriate."

It was thought possible that the FCC, at the same time it took action on pending requests of the Western Union Telegraph Co. and Motorola, Inc., for suspension or cancellation of the tariff changes, also might act on the long-pending petitions of the same companies for an investigation and hearing on the original Telpak tariff.

While Motorola and Western Union have questioned the level of the Bell System's Telpak rates — alleging competitive inequities — the commission's rulings on the tariff have been limited largely to how the service is furnished.

In protests against the filing, Western Union and Motorola referred to the commission's recent decision in a private line case. In it the FCC ruled out the five-year-old multiple-channel tariff, stating "AT&T has not justified differences in charges between large and small volume users for a like communications service between the same points."

Western Union said "The striking similarity between the multiple channel tariff and the Telpak tariff, if the proposed amendment becomes effective, makes it clear that regardless of terminology, the two tariffs are indistinguishable in purpose as well as in operation."

Motorola quoted the FCC's point that it has rejected in the past two message telegraph service offerings in which the carrier did not justify reduced rates on any differences in costs or service conditions, but "attempted to justify special reduced rate treatment by referring to a competitive service offering of another carrier."

Motorola also said "The same situation . . . prevails with respect to Telpak rates, only to a greater degree because Telpak provides for much greater discounts than the multiple channel tariff the commission rejected."

Motorola maintained "Clearly, the revised tariff schedules squarely present the same serious questions of patent discrimination . . . as were raised by AT&T's interpretation and application of the currently effective tariff since Telpak in this form is indistinguishable, except for the lower rates, from like communications services offered under other tariffs on file with the commission."

PROPER Protective Measures PRESERVE OUTSIDE

By RICHARD ALLEN

Close up of ground resistance measuring set used in checking condition of telephone grounds.

THE PRIME concern of a telephone company is to provide an excellent grade of service to its customers at the lowest possible cost consistent with its financial stability. It must have an adequate rate base to start with and must be able to cope with rising labor and material costs by effecting economies and improving the efficiency of each phase of its operation. This is particularly true when the company cannot obtain completely adequate rate increases because of unfavorable state regulatory commission decisions.

The outside plant constitutes a large part of a telephone company's investment on which it earns an income. If the plant can be preserved, good service can be rendered and at the same time a reasonable return can be obtained on the particular investment.

The plant in general is made up of open wire; distribution wire: aerial, buried, and underground cables; conduit and manholes; and associated items such as insulators, cable messenger, pole hardware and terminals. All these materials are exposed to destructive elements that tend to destroy them and cause service interruptions. Open type and distribution wires and supporting structures are exposed to storm damage and wood members are subject to decay and insect attacks. Moisture seeping through sheath breaks or holes in aerial and underground cables will cause shorts and grounds resulting in service failures. Squirrels, bullets, climber gaffs, and tree limb contacts are mechanical causes of sheath damage. Crystallization occurs at stress points in the sheath and at splice wipes as the result of cable movements, which permit moisture to enter.

Lightning and power contacts are other causes of damage to wire and cable facilities. These cause insulation breakdowns with resulting opens, shorts, or crosses. Insulation breakdown can be reduced by providing telephone conductors with an insulation of high dielectric strength as in the case of PIC cable and RD wire. Nevertheless, adequate electrical protection is needed to prevent, or at least minimize the damage from this source where other types of insulation are in use on the conductors.

Preventive maintenance is a very important factor in the continuation of good telephone service since it eliminates a good many causes of equipment trouble Nevertheless, adequate mechanical and electrical protective measures are needed to supplement the preven-

Adequate protective measures are needed to supplement the preventive maintenance program and assure the best possible condition of the outside plant.

PLANT

tive maintenance program and assure the best possible condition of the outside plant. Several protective measures are covered in this article: pressurization of cables, adequate electrical protection, good electrical grounds, and guarding of underground cables and conduit from damage by construction workers.

Use of sensitive gauge to measure pressure of dry air in pressurized cable as part of leak detection procedure.

Protection Of Cables By Pressurizing

THE objective of pressurizing cables is to reduce cable maintenance by preventing moisture from entering the cables through sheath holes. In the pressurizing technique, dry air from a compressor refrigerator unit at large exchanges (or nitrogen from tanks at small central dial offices) is introduced into the cables at the central office. The dry air or gas is under low, but constant pressure, which causes the cable to be completely permeated throughout its length.

The internal pressure of dry air inside the cable prevents moisture from entering the cable through sheath openings to dampen the paper insulation on the conductors and lower its insulation resistance, causing interruptions of telephone service through shorts, crosses, and grounds. Maintenance of this internal cable pressure results in an almost startling reduction of service troubles, with a corresponding decrease of subscribers' complaints, and detected troubles (reports by employes). Also, there is a reduction of current leakage, crosstalk, and line noise, since the dry air flowing inside the cable keeps the paper insulation dry.

In the case of exchange cables, the repair of minor breaks, which do not drop the cable pressure to a serious

Please turn to page 78

Cable splicer locating leak in pressurized cable by means of soap applicator. Arrow points to bubbles forming at the hole in sheath. The air coming out of the sheath opening causes a mass of soap bubbles to form and thus reveals the location of the break.

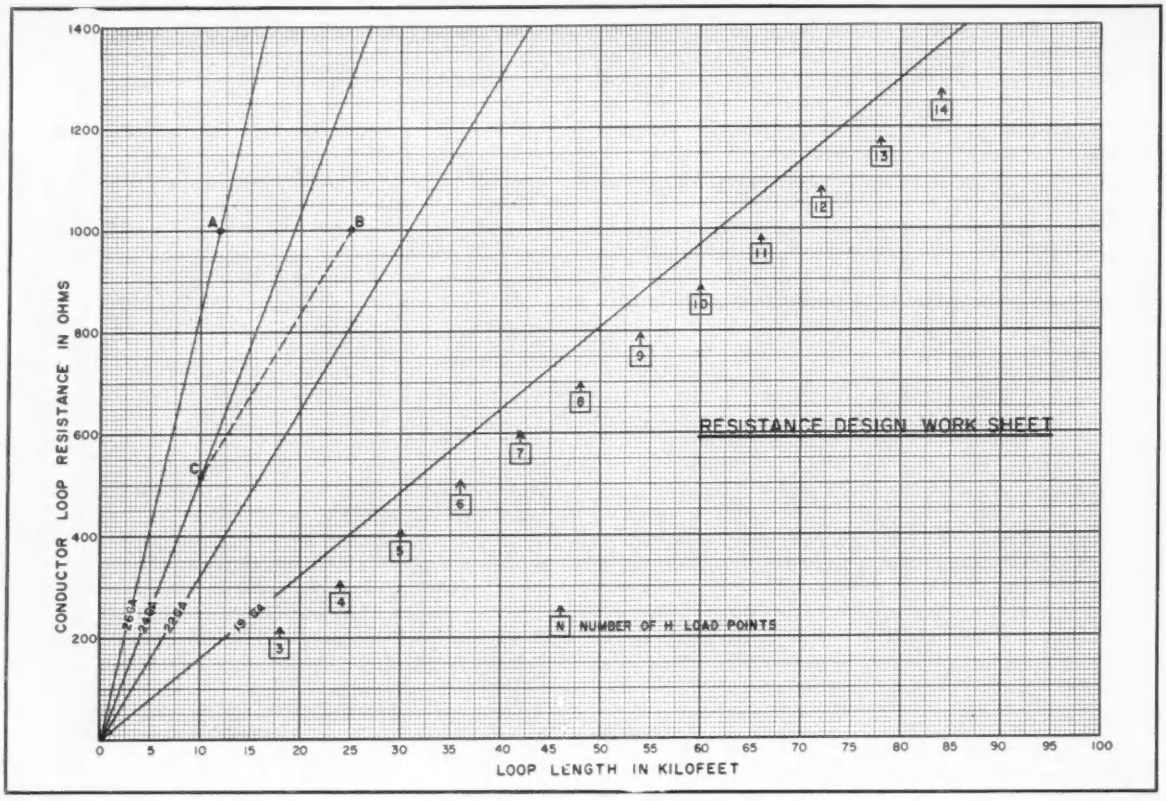

FIGURE ONE: — Resistance design work sheet.

Subscriber Loop Plant Design

By F. E. ELROD*

Field Service Engineer,
General Telephone Co. of the Southwest
San Angelo, Texas

Use of the resistance design method for local loop design results in better transmission, time saved in engineering of plant, and other important economies. By following the resistance design and transmission check procedure, any type subscriber loop can be designed to meet today's supervision and transmission limits.

THE SUBSCRIBER loop plant consists of the outside facilities, cable, open wire, loading, etc., that connect a subscriber instrument or PBX (Private Branch Exchange) to its serving central office. All telephone connections involve two loops, and whatever transmission condition exists on a customer's loop affects every call he makes or receives. Generally, the local loop loss contributes as much or more to the over-all transmission loss as do the toll links in a long distance call. For these reasons, transmission design of local loops is important.

Loops are designed today independent of trunks, and transmission objectives are established for loop plant in order to obtain a distribution average transmission. These objectives are directed at giving the customer what he wants at a price he can afford, with sound economics as the design basis. The present transmission objectives for subscriber loops is an average —4.0 to —5.0 DB effective, with a limit of —2.0 DB. For long rural loops a 2.0 DB tolerance is sometimes allowed when strict adherence would result in a severe cost penalty, making the limiting loop loss for such circuits 0 DB.

Mr. Elrod presented this paper at the 1961 convention of the Texas Telephone Association.

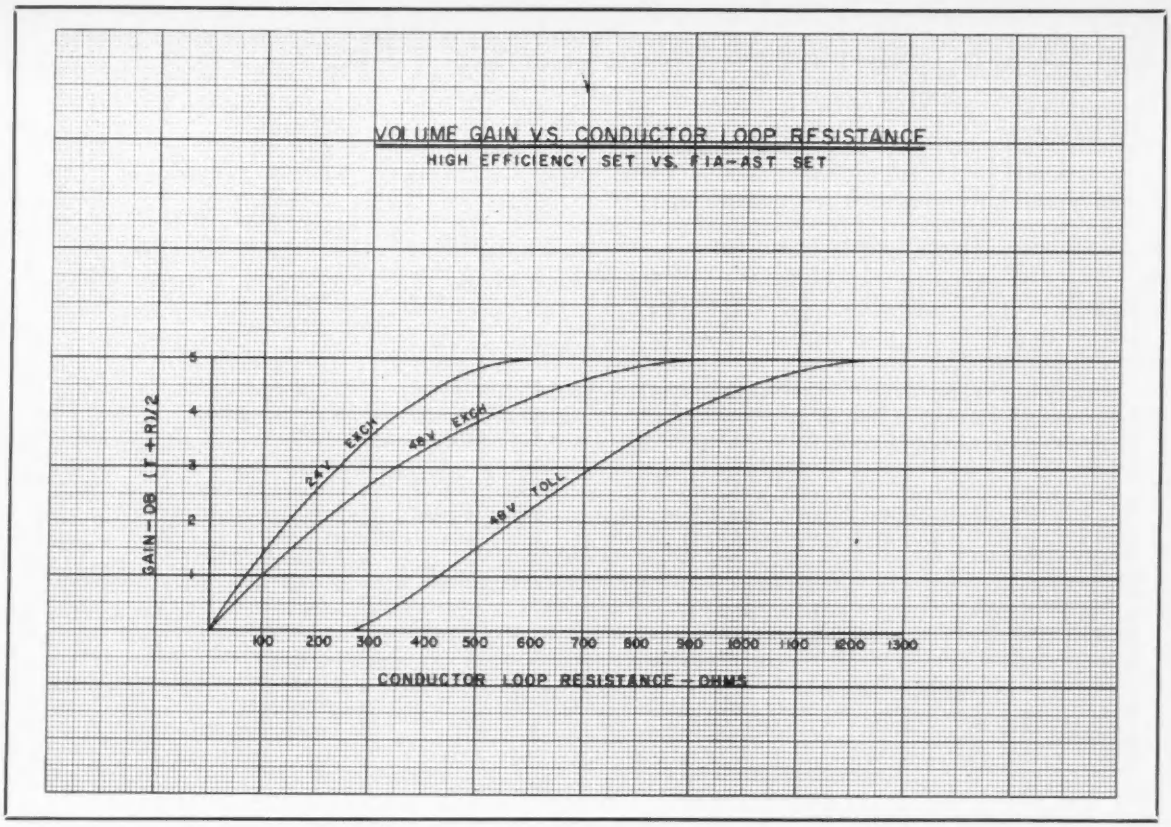

FIGURE TWO: — Volume gain vs. conductor loop resistance.

The subscriber loop plant also accounts for the greatest single investment of *all* the telephone plant required to provide telephone service. Because of this fact, it is necessary that these facilities be designed properly so as to meet transmission objectives and signaling limits in the most economical manner. The design engineer must be able to choose the proper facility if this aim is to be realized.

The design method must make efficient use of a limited number of cable and wire gauges, together with available instruments and loading schemes. Consideration must also be given to the engineering period which varies with the type of construction and to the availability of cable and money.

Two basic features control the selection of wire size or cable gauge for subscriber loop facilities: (1) The maximum allowable conductor loop resistance, based on the central office supervision limit; and (2) The loop transmission limit.

Resistance Designs

SUBSCRIBER loops are designed today to the maximum conductor loop resistance that the central office equipment will supervise. This method is known as "Resistance Design" and simplifies and reduces the over-all engineer work required in designing exchange plant. By the application of a few simple rules involving length, resistance, loading and instrument zoning, the design engineer can lay out the majority of the exchange plant without resorting to long and tedious transmission studies.

The method of rating the performance of telephone sets and associated subscriber loops has been evolved which takes into account the effect of various types of distortion, noise, sidetone and loudness of volume. The consideration of all of these factors is the basic concept of effective transmission. The reference point currently used for determining effective transmission for different telephone sets with different types of subscriber loop facilities is established in the use of the Standard Reference System as developed some years ago by the Bell System.

The loop loss factors used today are based on transmission comparisons of the circuit under consideration with the Standard Reference System, with relative gains showing up as minus and relative losses showing up as plus figures. With this brief introduction to local loop transmission considerations, the basic loop plant design can be undertaken.

The conductor loop resistance which will allow proper

dialing, supervision and ringing is a function of the design of the central office equipment. The manufacturers of central office equipment specify such limits for their equipment, with the limits usually falling in the following groups:

Office Type	Conductor Loop Resistance (ohms)
Common Battery	600-850
Dial — All Relay	850-1050
Dial — S x S	1,000-1,300*

*** The 1,300 ohms upper limit for dial offices must be adjusted downward for resistance increase of cable due to temperature increase. To eliminate this adjustment, one solution is to subtract 100 ohms for the temperature effect, making the upper limit 1,200 ohms when aerial cable is involved.**

The first step in an analysis of gauge requirements for any cable loop project will be to determine as accurately as practicable the total "ultimate" length of the cable. The term "ultimate" as used here refers to the end of the expected life of the cable being engineered. Where lack of specific engineering considerations dictate the ultimate length of cable, the following general rules may serve as a guide:

(1) For leads serving only *metropolitan areas*, assume all cable to the most distant subscriber ultimately expected to be served by the lead.

(2) For leads serving *suburban areas*, assume all cable to the most distant subscriber ultimately expected to be served by the lead. If the cable is to be extended to serve rural areas, assume cable up to the point where the ultimate requirements are ten circuits. Beyond this point assume open wire.

(3) For leads serving *rural areas*, assume cable only as far as the point where the ultimate requirements are ten circuits. Where ultimate requirements are less than ten circuits, assume open wire.

If open wire is to be a part of the basic design for any route, the design loop length is the length of the cable portion only. In such cases the resistance of the open wire portion is met by the use of long-line equipment if the total loop resistance exceeds the office limit. Considerable economy can at times be accomplished by selecting the design loop length on the basis of serving 95-98% of the lines on the lead and specifying long-line equipment to care for the remaining 2-5%. Having determined the design loop length, the next step is to determine the most economical gauge or combination of gauges that will span the required distance without exceeding the office conductor loop resistance.

In this connection it should be noted that for reasons of standardization, only four gauges of subscriber loop cable are available for general use. These are: 19, 22, 24 and 26 gauge. Where a combination of gauges is required to meet specified loop resistance, it can be proved that the greatest economy will result if not more than two gauges are used and that these be successive;

A.

48V SXS OPR-NL LOOP-AST SET

LOOP FACILITY	LENGTH KFT.	D. C. OHMS PER KFT.	D. C. OHMS AMT.	DB PER KFT.	T+R/2 AMT.
26 GA. CA.		83.3			
24 " "	10.0	51.9	519	.191	1.91
22 " "	15.0	32.4	486	.049	.74
19 " "		16.1			
083 STEEL		22.2			
109 "		14.7			
080 COPPER		3.2			
104 "		1.9			
080 CU. STEEL		8.3			
104 " "		4.9			
CA. BRIDGE TAP				.25	
O.W " "				.025	
L. LINE ADAPT.				EA. .40	
LOAD COIL		9.0 EA.			
SUBSET					
TOTAL	25.0		1005		2.65
LIMIT FOR EXCHANGE			1000		-2.00

B.

48V SXS OPR-H88 LOOP-AST SET

LOOP FACILITY	LENGTH KFT.	D. C. OHMS PER KFT.	D. C. OHMS AMT.	DB PER KFT.	T+R/2 AMT.
26 GA. CA.		83.3			
24 " "	8.0	51.9	415	.191	1.53
22 " "	17.0	32.4	551	.049	.83
19 " "		16.1			
083 STEEL		22.2			
109 "		14.7			
080 COPPER		3.2			
104 "		1.9			
080 CU. STEEL		8.3			
104 " "		4.9			
C.A. BRIDGE TAP				.25	
O.W. " "				.025	
L. LINE ADAPT.				EA. .40	
LOAD COIL	4	9.0 EA.	36		-4.50
SUBSET					
TOTAL	25.0		1002		-2.14
LIMIT FOR EXCHANGE			1000		-2.00

C.

48V SXS OPR-H88 LOOP-HIGH GAIN SET

LOOP FACILITY	LENGTH KFT.	D. C. OHMS PER KFT.	D. C. OHMS AMT.	DB PER KFT.	T+R/2 AMT.
26 GA. CA.		83.3			
24 " "	8.0	51.9	415	.191	1.53
22 " "	17.0	32.4	551	.049	.83
19 " "		16.1			
083 STEEL		22.2			
109 "		14.7			
080 COPPER		3.2			
104 "		1.9			
080 CU. STEEL		8.3			
104 " "		4.9			
CA. BRIDGE TAP				.25	
O.W " "				.025	
L. LINE ADAPT.				EA. .40	
LOAD COIL	4	9.0 EA.	36		-4.50
SUBSET					-5.00
TOTAL	25.0		1002		-7.14
LIMIT FOR EXCHANGE			1000		-2.00

FIGURE THREE.

i.e. 26 gauge with 24 gauge, 24 gauge with 22 gauge, 22 gauge with 19 gauge.

In other words, 26 gauge is the most economical to use up to a length where all 26 gauge just meets the resistance limits. Beyond this point the most economical gauge is a combination of 26 gauge and 24 gauge up to the point where all 25 gauge will just meet the resistance limit. Beyond the point where all 24 gauge loop

Please turn to page 52

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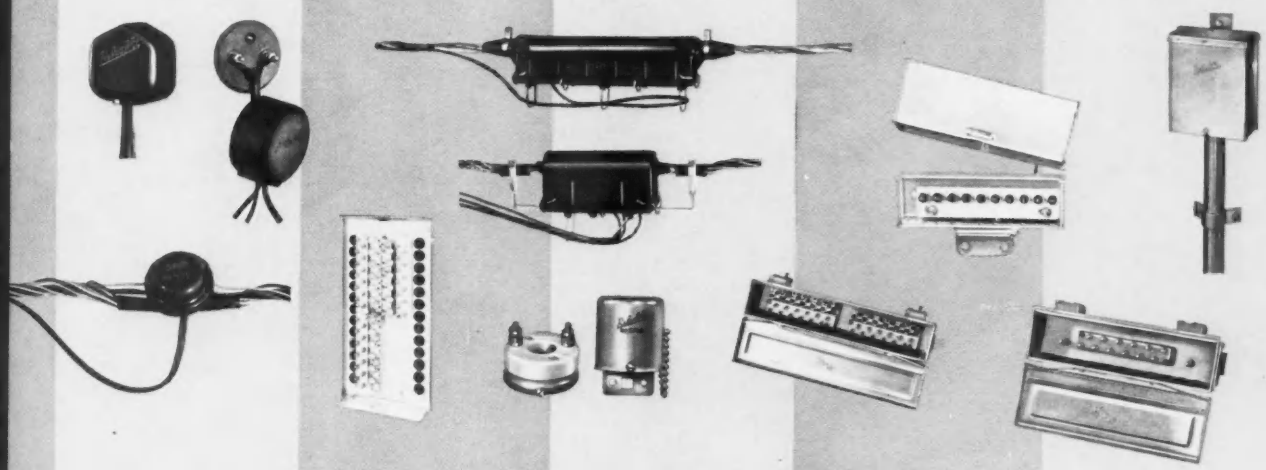

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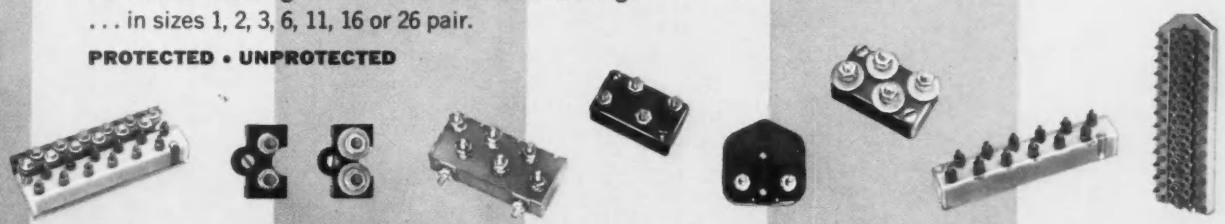

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will serve the most economically is a combination of 24 gauge and 22 gauge, etc., until all 19 gauge is required.

Determining Most Economical Combination of Gauges

THERE are two general methods of determining the most economical combination of gauges to arrive at the required resistance value. Because of the ease and directness associated with the graphical method, it is usually chosen over the algebraic method. A standardized work sheet has been devised for use in connection with the graphical method, and a description of the development of the work sheet will aid in an understanding of its use.

If a standard sheet of graph paper is used and a graph of loop length horizontally and resistance vertically is made, each cable gauge will appear as a straight line (see *Figure One*). Such straight line graphs for each gauge pass through zero on both the horizontal and vertical axis since a zero length loop has a conductor loop resistance of zero. Correspondingly, the slope of each straight line corresponds to the resistance per unit length for the gauge involved.

For instance, to find the length of 26 gauge cable corresponding to 1,000 ohms, follow the 1,000 ohm grid line horizontally until it intersects the sloping 26 gauge graph (point A on *Figure One*). This will be located at approximately 12.0 kilofeet.

Consider now the case where the loop length and allowable loop resistance is known, with the unknown being the cable gauge. Assume a 25.0 kilofeet loop with a 1,000 ohm conductor loop limit. Plot this on the chart (point B on *Figure One*). This point falls between the 22 gauge and 24 gauge line, indicating that a combination of these two gauges will be required. From this established point, a dashed line parallel to the 22 gauge line is drawn until it intersects the 24 gauge line. This will be found at a point (point C on *Figure One*) corresponding to a length of 10.0 kilofeet. This indicates that 10.0 kilofeet of 24 gauge and 15.0 kilofeet of 22 gauge (25.0 minus 10.0 = 15.0) will be required for a 25.0 kilofeet loop if it is to meet a 1,000 ohm loop limit.

Any single gauge or combination of gauge loops can be obtained in this manner with the maximum length and conductor resistance known. Where cable loops are 18.0 kilofeet or longer, the resistance of load coils should be deducted from the total loop limit, anticipating VF loading will be required. Penalties for the temperature effect on aerial cable should also be considered in arriving at the central office conductor loop resistance limit for design purposes.

With the lengths and gauges arrived at in the procedure outlined above, additional considerations must still be given to location of branch cables, location of

Please turn to page 90

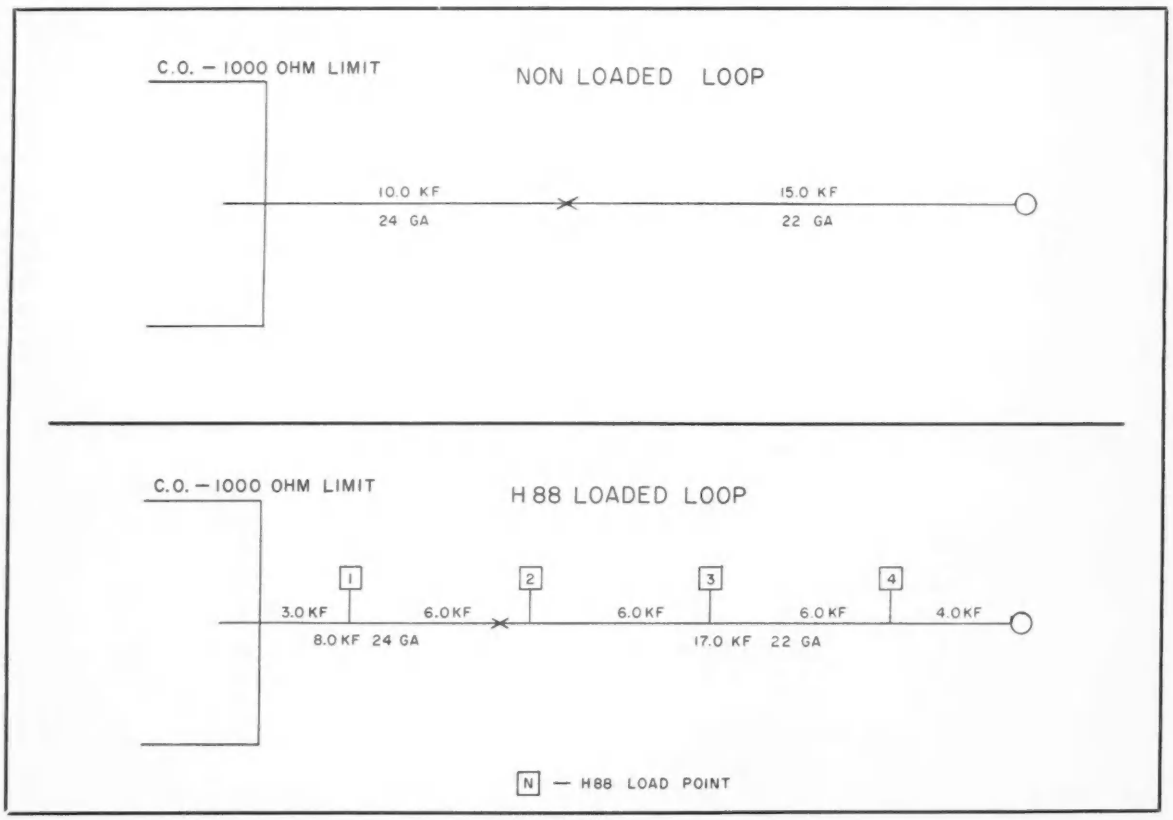

FIGURE FOUR.

TEMPORARY GROUNDING

Testing, temporary grounding, or insulating, protect workmen during the course of their jobs. Permanent grounding protects workmen and the public 24 hours a day.

By E. W. GLANCY*

TEMPORARY grounding is a fairly broad field and it's only fair to point out I don't intend to cover all of it. I hope you will bear with me if I cover only some areas associated with work operations on and near poles jointly occupied with electric utilities.

Just what are we trying to accomplish by temporary grounding? Usually, we are trying to protect our workmen against electric shock accidents. Obviously this isn't the only means of providing such protection. If it were, many of our friends who manufacture rubber gloves, rubber line hose, etc., would have gone out of business long ago. In other words, we have a choice as to whether we should ground or insulate.

Pole Replacement In A Line Carrying Energized Wires

LET'S look at a familiar type of work operation with this in mind. Specifically, take the problem of replacing a pole in a line carrying energized power wires.

In work of this kind, we recognize there are two types of contacts which may occur: First, the pole being set or removed may contact a live wire and provide a non-metallic current path to the workman; second, if the derrick or winch line makes contact, we may have a metallic current path to the workman. Both situations have occurred and both have claimed a number of victims. Is temporary grounding or temporary insulation the right answer to this problem?

To begin with, we know that if we can get a good enough ground, we can achieve dependable protection for personnel. There is a problem, though — where do we get a good ground out in the field? A fire hydrant, for example, would usually be a good enough ground, except where non-metallic water mains were involved. And of course, fire hydrants are not always conveniently located to a given work operation.

The electric company's multigrounded neutral would make an excellent ground for the protection of personnel. Unfortunately, it's located up in power space on the pole, and in the Bell System it is fundamental that telephone workmen stay out of power space.

Mr. Glancy is an engineer with the American Telephone & Telegraph Co., New York City.

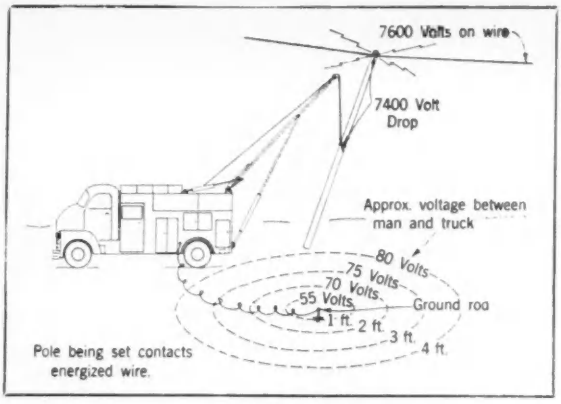

FIGURE ONE.

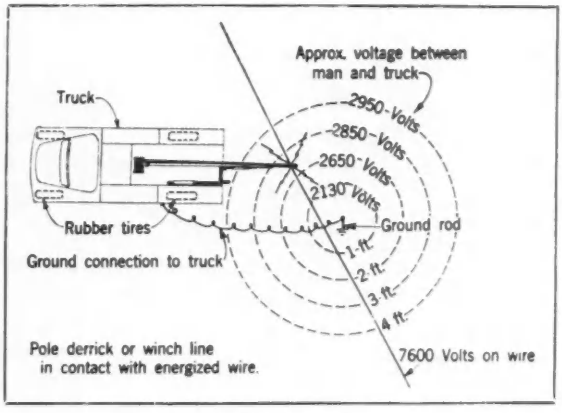

FIGURE TWO.

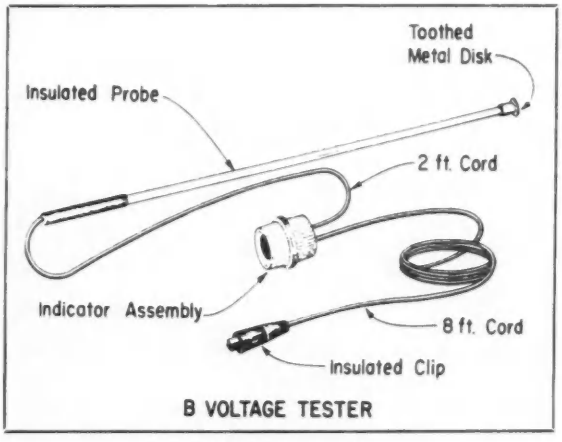

FIGURE THREE.

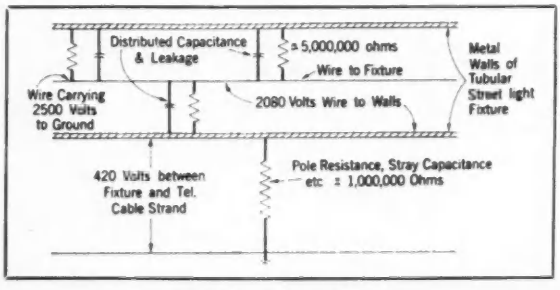
Distributed Capacitance & Leakage
≈ 5,000,000 ohms
Wire to Fixture
Metal Walls of Tubular Street light Fixture
Wire Carrying 2500 Volts to Ground
2080 Volts Wire to Walls
420 Volts between Fixture and Tel. Cable Strand
Pole Resistance, Stray Capacitance etc. ≈ 1,000,000 Ohms

FIGURE FOUR.

Some poles have vertical grounding conductors connected to these neutrals, however, and temporary ground connections could be made in these cases. We merely need a heavy, flexible conductor, with good solid connections which would not be pulled loose as the truck moved about, and this can be done.

Quite apart from the electrical safety angle, the cord under foot might well trip a workman intent on keeping the pole under control. While this arrangement might not be too objectionable, there are many poles where the multi-grounded neutral could not be used for temporarily grounding the truck.

How about our own telephone cable and strand? Isn't it a good ground? Except for isolated cable, we consider it a good ground. In fact, it's connected to the electric company's neutral in many places. Unfortunately, we have a lot of poles that do not carry cable — just drop wire, multiple drop wire, open wire, etc. — and there are no good grounds available with these kinds of plant. What can we do under these circumstances?

Use of Ground Rods

WITH all this "do-it-yourself" business going on these days, it's only natural to consider making our own ground right on the job by driving a ground rod.

Now let's see how this works out in the particular case of a line carrying 7,600 volts to ground. If the pole contacts a phase wire, there are two major factors which influence the result: One is the resistance of the pole and the other is the resistance of the ground. A wet pole always has a lower resistance than a dry pole, and the variation may be as much as 100 or even 1,000 to 1. Ground resistance is influenced by moisture in much the same way except that moist earth doesn't always provide a low resistance ground.

You can't tell the resistance of a given pole or ground merely by looking at it and measurements are time consuming and expensive.

Figure One shows the sort of voltage distribution we might expect in a representative case. I have assumed a 40-foot pole with the hitch in the middle, a pole resistance of 500 ohms.

As current flows through the pole to the winch line, through the truck body and to the ground rod, we will get a fairly large voltage drop along the pole — about 7,400 volts. A man standing on top of the rod would be exposed to *no* difference of potential when he touched the truck. The farther from the rod, the greater the voltage between truck and ground, but with a 1,500-ohm man and a 500-ohm ground, the maximum we can expect in this particular case is about 140 volts.

If the ground resistance were doubled or tripled, and everything else remains the same, the maximum voltage he could encounter would nearly double or triple. Conversely, if only the pole resistance were doubled, the maximum voltage he would encounter, would be approximately halved. Evidently the protection provided here is somewhat uncertain even at 7,600 volts,

and if this happened to be say 13,000 volts to ground, the voltages shown would all be increased by about 70 per cent.

Still looking at this same 40-foot pole in contact with 7,600 volts, what happens if a man touches it say six to seven feet from the butt end? Because of the added resistance of the pole in series with the man, we can expect about 1/10 the voltage we find when he touches the truck. This would be a maximum of about 15 volts for this particular situation, which looks safe enough.

What happens if the derrick or the winch line touches the 7,600 volt wire? As *Figure Two* shows, at a distance of four feet from the rod we have a potential of nearly 3,000 volts to the truck. Here the ground rod provides no protection at all. A man would have to be standing on top of it to be safe!

Quite apart from personnel protection, we know that if we have a situation where our 7600-volt wire contacts the pole after it is set, a pole fire is likely to follow. Here we are forced to leave temporary insulation in place or else lose the pole.

To sum up in a few words: setting poles in an energized 7,600-volt line is a situation where temporary grounding provides adequate protection any time we have access to a good enough ground. However, in many cases where only a driven ground would be available, personnel protection is uncertain. Temporary insulation protects both the workman and the pole without regard to the type of resistance of the available ground or the pole. The term "temporary insulation" includes, of course, rubber gloves for the workman.

Operations On Joint Poles

NOW, let us take a look at operations on joint poles — specifically jointly occupied poles bearing street light fixtures.

We lost two workmen in one year as a result of accidental contacts with energized street light fixtures. This unfortunately follows a historical pattern of about one accident a year from this source for the past two decades in the Bell System.

One of the accidents could be likened to the case of the horse being stolen while the stable was being locked. Work was in progress to permanently ground the street light fixtures on the very street where this man was killed. This particular fixture had not yet been grounded, or the accident would not have happened.

For the past several years, Bell System companies have been negotiating with electric utilities to permanently ground street light fixtures, and a number of utilities have agreed to do this.

Negotiations are going on with other utilities. Some, we know, face internal difficulties on this point. These considerations plus the sheer number of fixtures involved, and economic considerations indicate that this cannot be done overnight. It will take time, and we recognize this fact.

For many years, Bell System instructions to workmen regarding street light fixtures could be summed up in the phrase — *"Don't touch them."* Unfortunately when a fixture is only inches, and sometimes less, from a grounded cable or a terminal, it is all too easy to make accidental simultaneous contact. All but one of this type of accident which have occurred over the past 20 years happened on poles bearing telephone cable attachments, and the cable provided the ground contact for the victim in all but two cases. You can see why grounding of street light fixtures looks attractive.

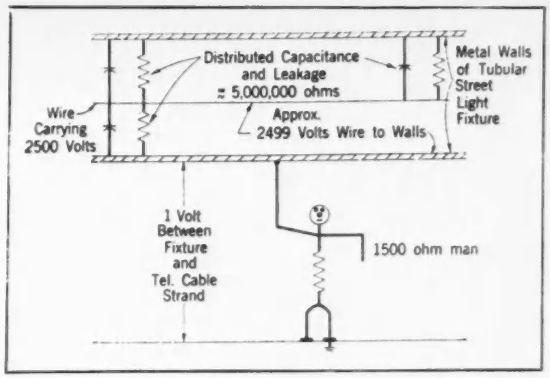
Distributed Capacitance and Leakage ≈ 5,000,000 ohms
Metal Walls of Tubular Street Light Fixture
Wire Carrying 2500 Volts
Approx. 2499 Volts Wire to Walls
1 Volt Between Fixture and Tel. Cable Strand
1500 ohm man

FIGURE FIVE.

Temporary Grounding

SINCE we knew it would take time to accomplish permanent grounding, we felt temporary grounding might provide an answer.

A review of our past history of accidents showed a number were at least partly caused by series street light circuits becoming crossed with primary conductors. Shorting a series street light circuit backed by seven amperes or so is one thing — but short-circuiting a circuit capable of delivering for example 100 amperes at several thousand volts is quite another. We could visualize a nasty arc and molten metal being spattered about. It was apparent we ought to be as sure as possible the fixture was not energized when the temporary bond was applied.

To accomplish this, we employ a device which we have dubbed the B Voltage Tester. *Figure Three* provides a fairly good illustration of this device.

As you can see, there is an insulated probe equipped with a toothed metal disc to make contact with the object being tested. The cord coming out of the handle is connected to a 1/8-watt neon light in a plastic housing. A second cord coming out of the housing is terminated with a small universal clip. A string of resistors has been included inside the probe to limit the current.

This tester weighs only about 1/2 pound, costs less than five dollars, is very sensitive, and — despite its appearance — rugged. You can step on it or drop it 30 or 40 feet onto a concrete pavement and it still functions perfectly. It will detect voltages as low as 60 volts and may be used without damage up to about 7,000 volts or so if the contact is limited to 10-15 seconds. Longer periods of contact will, of course, damage it at the higher voltage.

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"Temporary Grounding"

(Continued fro page 55)

We were embarrassed to find this tool a little too sensitive, as a matter of fact. It will operate on currents measured in microamperes. Because of this it indicated some fixtures were dangerous when they were pratically normal. Our friends in the electric utilities don't appreciate being informed a street light is energized and then find it is afflicted merely with a normal leakage or capacitive coupling. We can't blame anyone for being annoyed in these circumstances.

It looked as though the most likely candidates for these false alarms would be the internally wired variety. There certainly is some capacitance between any piece of wire in a metal pipe and the pipe. *Figure Four* illustrates the situation In a typical case we might expect an impedance of about 5,000,000 ohms between the wire and the pipe. We can also expect to find something like 420 volts between the fixture and the cable. What does this mean?

Let's consider the maximum current we could expect to draw through this combination. To make the arithmetic easy, let's assume a 2,500 volts to ground circuit. Applying Ohms Law, we would expect a maximum current of only a half milliampere. This current is small enough so that it can barely be felt, but even this is larger than the current the voltage tester requires to make it glow.

If a man touches the fixture in this condition, we can expect the voltage to divide as shown in *Figure Five*. The voltage between the fixture and the cable has dropped to about one volt which is certainly no hazard to personnel. In this case, if our 1,500-ohm man happened to be touching the fixture while he was testing it, the tester would not glow.

You may recognize that the combination of wire, metal pipe, telephone cable, etc. is really a "voltage divider." As shown in *Figure Six*, the principle is a simple one: If we want 1/3 of the voltage across a source, we merely take a tap on a resistor or impedance of some kind

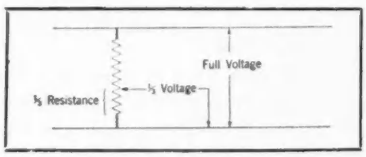

FIGURE SIX.

across the source so that 1/3 of the resistance or impedance is between the tap and one end. If we want 1/4 the voltage, the tap goes at the 1/4 point on the resistor, etc.

Need For A Voltage Divider

IN OUR particular problem, we wanted a voltage divider which would give us only about one per cent of the voltage on the wires in the street light fixture. The solution turned out to be a capacitor which has an impedance of about one per cent of the impedance which exists between the fixture and the wire inside. As *Figure Seven* shows, only about one per cent of the voltage is available between the street light fixture and ground — usually our cable suspension strand. As you can see, in this case, we will only have 25 volts across the tester, and it takes about 60 volts to make it glow.

Figure Eight shows a workman making the test using a capacitor. One lead of the capacitor terminates in a universal clip which is used to connect it to the cable strand. A piece of wire equipped with a universal clip on each end is used to complete the connection to the tester.

If there is an honest-to-goodness breakdown of insulation, as sometimes happens, the whole 2,500 volts appears right on the street light fixture. The voltage on the fixture is not affected by the condenser if it is really "hot" and the tester will glow. Pretty much the same effect could be obtained by using a resistor instead of a capacitor.

However, if we had 5,000 volts on this fixture, and we used a 50,000-ohm resistor, it would dissipate 500 watts and this would make it heat up mighty fast. We did not want anybody to burn his hands thermally or electrically, so we used a capacitor which

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These Equalizers are of the shunt L/C type with a continuously **ADJUSTABLE** Series **RESISTANCE** having a **DIAL CALIBRATED DIRECTLY IN OHMS.**

LE-115 EQUALIZER
35 - 15,000 cps . . . Bulletin HPS-159

SEE THEM AT THE USITA CONVENTION RM. 639A . . . or Graybar Rm. 617

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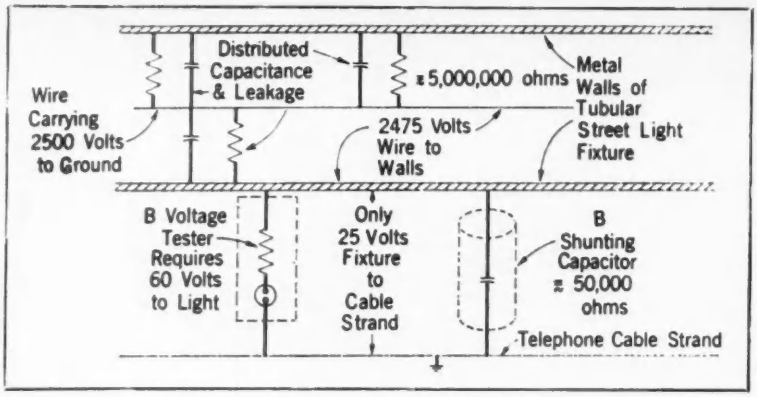
3200 N. San Fernando Blvd. Burbank, Calif.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≅ 5,000,000 ohms
Metal Walls of Tubular Street Light Fixture
Wire Carrying 2500 Volts to Ground
2475 Volts Wire to Walls
B Voltage Tester Requires 60 Volts to Light
Only 25 Volts Fixture to Cable Strand
B Shunting Capacitor ≅ 50,000 ohms
Telephone Cable Strand

FIGURE SEVEN.

generally does not heat up.

As I mentioned earlier, we felt we had to test before the temporary bond is placed. The mere fact that the light is not burning is no guarantee that the fixture is not energized. For example, if the insulation in the fixture has failed and one side of the series circuit is broken, the fixture can be energized to maximum voltage, but the light will be out. We find the notation "light not burning at time of accident" on a number of accident reports.

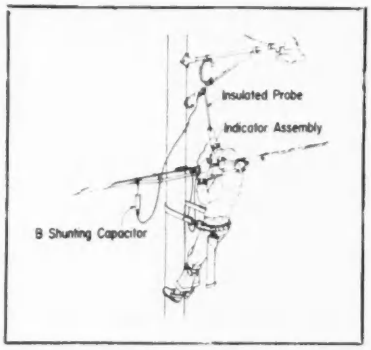

FIGURE EIGHT.

Temporary Ground Connection

THE temporary ground connection or bond we are now using is simply a five-foot piece of #14 stranded wire equipped with universal clips on each end. It only takes a man a minute perhaps to install the bond, and the bond itself costs about $1.50. Believe it or not, we have had comments that placing the bond after testing was "gold plating the job."

We had a case where a workman apparently tested a street light fixture, found nothing and for some reason failed to place the temporary bond. A few minutes later, a defective timer operated and the chain hoist he was using happened to swing against the fixture and drew an arc. Luckily, he had not removed his rubber gloves. This man at least is convinced that temporary grounding is far from "gold plating the job."

Recognizing the possibility of a fixture becoming energized after it has been tested, we instruct our workmen to wear rubber gloves when they place the bond. Obviously, this possibility increases with the length of time which elapses between making the test and placing the bond. The usual time is quite small — a minute or less and likelihood of the fixtures becoming energized during this period is also quite small.

Because of the possibility of crosses between street lighting circuits and primaries, the bond may be subjected to currents considerably in excess of the seven amperes or so commonly encountered in series lighting circuits. We warn our workmen to descend from the pole immediately, if the bond starts to smoke. We think this is fairly unlikely to happen, of course because the solid connection to a good (low impedance) ground will usually result in a heavy enough fault current to operate the circuit breakers and de-energize the circuit long before the bond burns up.

With this background, it is not hard to see why we limit the practice of temporary grounding of street lights to poles carrying good, accessible grounds. In practice, this means poles carrying telephone cable or an

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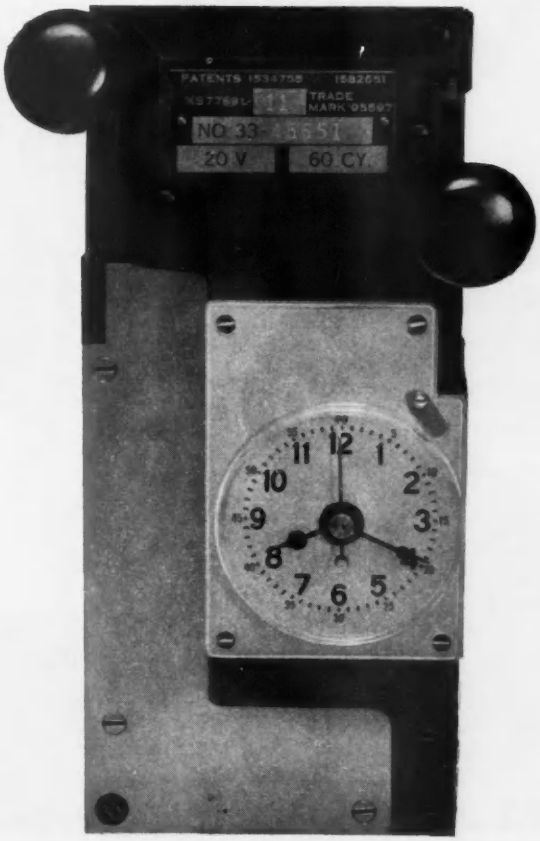

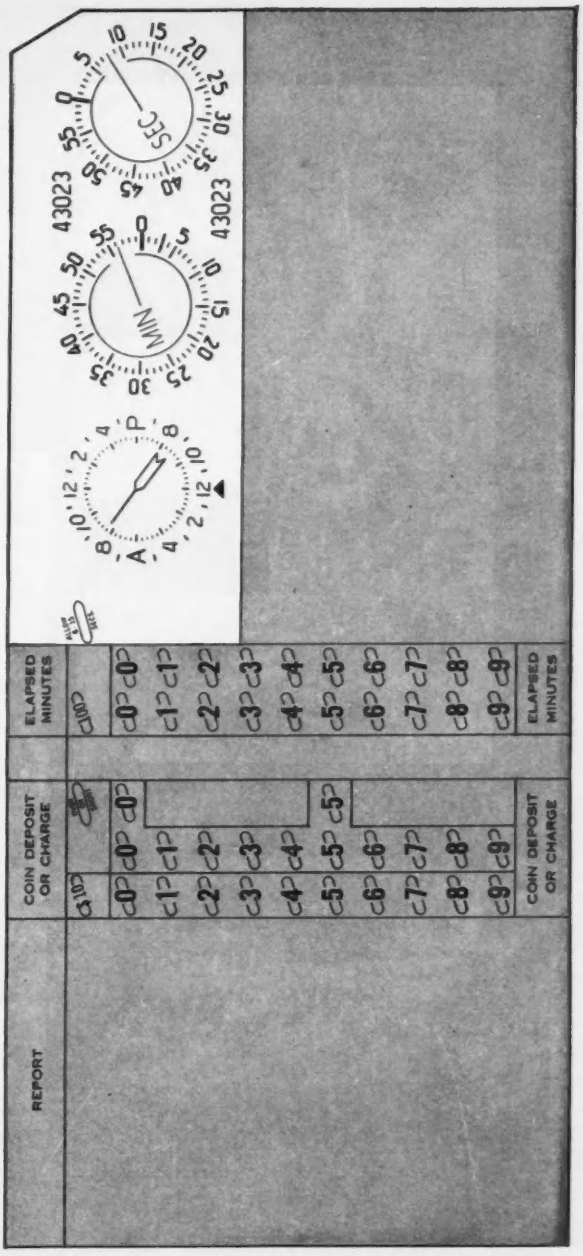

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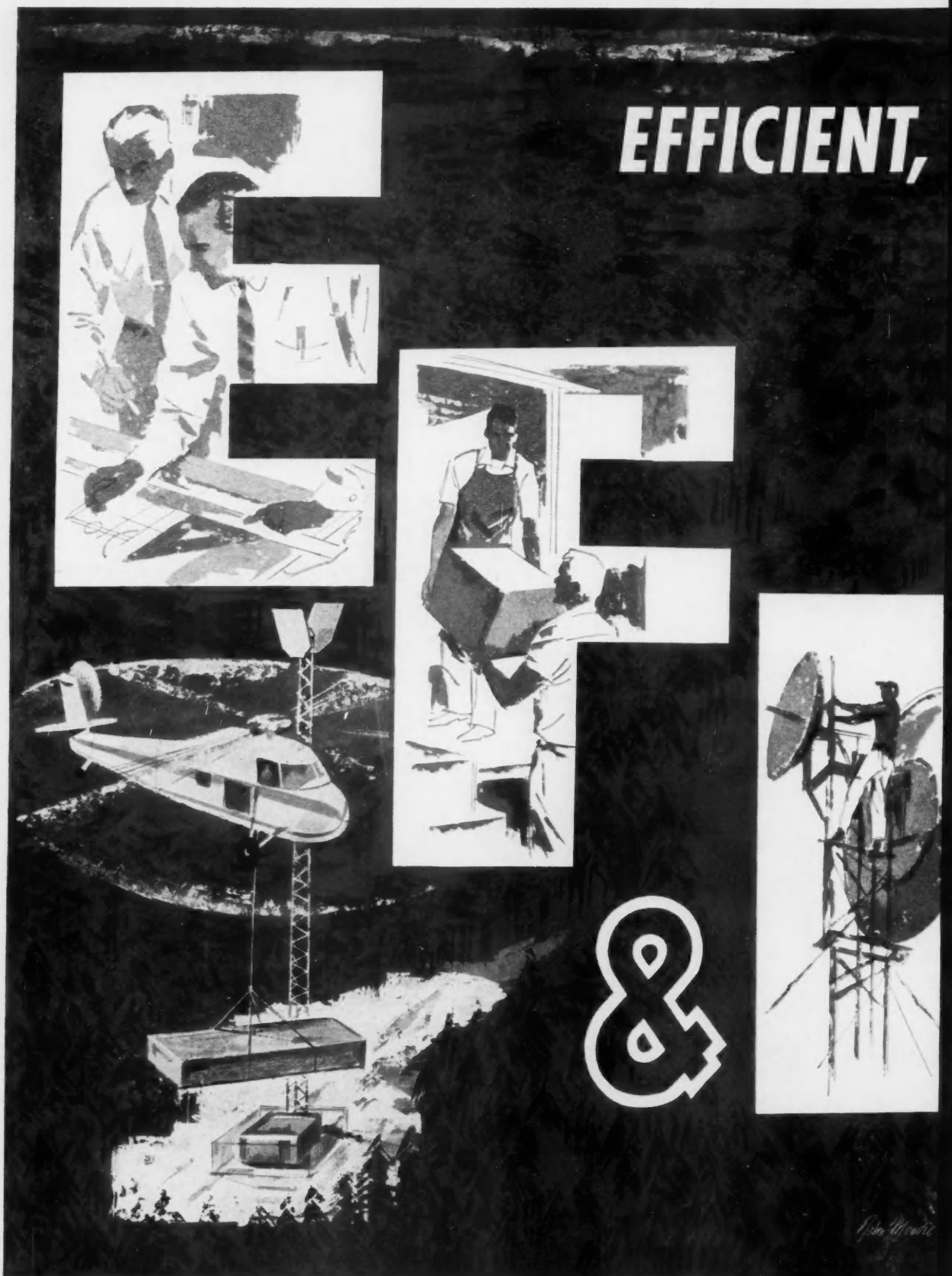
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High Gain — Signal gain with proper impedance match, 200 to 400 times input signal. Gain 2 to 3 times that of Model E. Gain is adjustable by knob.

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MODEL A — The complete Unit for locating grounds, shorts, wet spots and other faults in cables. In addition will locate and determine the depth of buried pipe or conductor. With fish-tail exploring coil, neutral pick-up coil and headphone.

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MODEL L — SIMPLE TO USE. SAVES TIME.

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STEWART BROTHERS
Division of Instrument Laboratories
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accessible vertical power grounding conductor connected to a multi-grounded neutral.

We do not call for temporary grounding of street lights on poles carrying open wire or drop wire unless we have access to a power multi-grounded neutral. The reason being of course that the only ground we could get onto in these situations would be a local-driven ground rod, and we do not consider such a ground adequate to provide protection against the voltages we have encountered on street lights. Also, a wire dangling from a pole might be caught by a truck and ripped off. This is not as far fetched as it may seem. A few years ago, we had a man pulled off a pole when a truck caught a dangling hand line fastened to his body belt.

I mentioned earlier we lost two men in one year because of energized street light fixtures. Both of these men would have been saved if the procedure of testing and temporary grounding had been followed. All of the 20 or so accidents involving street light fixtures over the past two decades could have been avoided by the same means.

Couldn't these accidents also have been avoided by temporary insulation in the form of say rubber blankets? I don't think we can answer this question with any degree of certainty because we don't have enough detail as to the type of fixtures which were involved.

Our standard rubber blanket is three feet by three feet square, and we know there are some types of fixtures which would be extremely difficult to cover with blankets. Further, most of the fixtures we have encountered were attached to the pole by at least one through bolt, and it would be all too easy to miss covering up these bolts. Obviously, if a fixture is grounded at one point, the entire fixture is grounded. So we may conclude that in this case, grounding appears to provide somewhat more complete protection than insulating.

You will note I have referred to vertical power grounding conductors as points of connection for temporary grounds. Usually, these grounding conductors are associated

---

HIDDEN WOOD DECAY UNMASKED BY BELL LABS

WOOD telephone poles mean telephone service to some people, a place to immortalize young love with a heart and initials to others, and to still another of the world's population, wood poles mean a cozy home. This last group is the fungi, which enter wood poles, spread throughout them and destroy the wood.

It is this group that claims the attention of Outside Plant Development people at Bell Telephone Laboratories. These fungi can cause serious decay which, in turn, may cause telephone pole breaks. Danger to people, disruption of service and costly repairs are just some of the effects of pole breaks. Learning the reason behind pole breaks is a basic part of trying to prevent them from recurring. When there is some doubt as to why a pole has broken, a section near the break is sent to the Laboratories for examination and determination of the cause.

Until recently, this was done by a long and painstaking process of microscopic examination to find the fungus. A microscope was needed because certain common evidences of decay-cracks and checking are often invisible to the naked eye due to the presence of wood preservative which masks them.

Now, however, Bell Laboratories engineers are using an old technique — applied with a new purpose — to lay bare to the human eye the signs of decay. This method, called the hot toluene extraction method, has been used to determine the amount of wood preservative present in a wood pole. By suspending sections of the wood in flasks of boiling toluene, the vapors from the toluene pass through the wood and remove the wood preservative and moisture. It was found, recently, that when these elements were removed, the cracks and checks typical of decay were disclosed to the human eye.

This recently discovered benefit of the hot toluene extraction process — unmasking the evidences of decay — has been reaffirmed by microscope examination. This process, which is faster than former methods, provides Bell Laboratories engineers in the Outside Plant Development area a new tool with which to carry on their fight against enemies of the "Atlas" of the telephone industry — the wood telephone pole. — (*Message Register.*)

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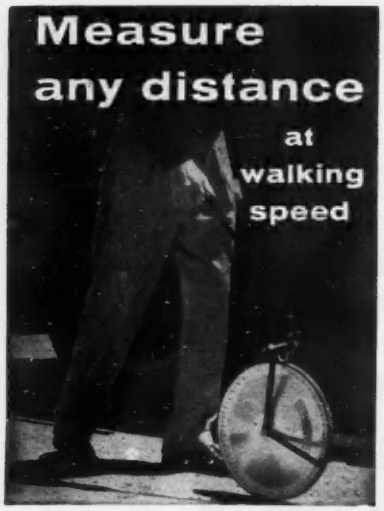

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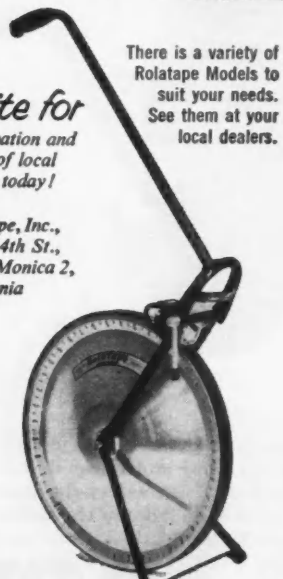

Rolatape
Measuring Wheels

with capacitors or transformers. We have learned through painful experience these wires may be dangerous in themselves. We have found the predominant cause of these vertical grounding conductors being energized to be failure to make or maintain connection to the multigrounded neutral. We have also found some were energized because of reversed connections and leaky lightning arrestors. We even had one case where a 7,600-volt phase wire was connected to the vertical grounding conductor.

As a matter of fact, it was a result of a fatal accident stemming from an energized grounding conductor that we developed the B Voltage Tester. Hence, it is not surprising to find that Bell System Practices call for testing vertical grounding conductors with the voltage tester before climbing a pole. Without the test, of course, we could be setting the stage for an accident if we were to make a temporary connection to a "hot" ground wire.

Testing Vertical Grounding Conductors

IN MAKING this test, we first establish a temporary ground which may consist of a screwdriver pushed in the ground or a bar of solder laid on the earth or the pavement if the immediate area happens to be paved. The clip of the voltage tester is attached to the temporary ground, and the probe is touched to the grounding conductor. The sharp metal teeth on the end of the probe facilitate making contact with wires which may be covered with corrosion products or deteriorated weatherproof covering.

There is no doubt, of course, that the temporary ground we use to make this test is a high resistance ground. However, because of the extreme sensitivity of the tester, this ground connection is not critical.

We have also experienced several accidents arising from energized metal conduit on poles. As far as I have been able to determine, all of these cases involved secondary voltages—about 115 volts to ground. One resulted in a fatality, however. As a result of this experience, our practices now call for making the same test on metal conduit on poles as I described a moment ago, unless a bond wire to our cable or the power company's neutral is plainly visible.

We have not called for temporary grounding of metal conduit because the circuits it carries are normally energized 24 hours a day. The likelihood of a sudden breakdown in insulation in the course of a given work operation appears to be remote.

Permanent ground connections to these various items of electric plant I have been talking about would, of course, eliminate the need for this testing and temporary grounding procedure. However, until permanent grounding of these facilities is completed, our voltage testers and temporary bonds are going to be busy.

In closing, I would like to add that our procedure of testing these various items has turned up quite a list of energized objects. The electric utilities have always cooperated with us to clear up these hazards. We all recognize that electric shock kills or injures without regard to whether the victim is a telephone man, a power man, or an inquisitive youngster. Testing, temporary grounding or insulating protects workmen during the course of their work. Permanent grounding protects both our workmen and the public — twenty-four hours a day. —*Adapted from a paper presented at the* 1960 *National Safety Congress.*

Magnet Wire Brochure

ANACONDA Wire & Cable Company has issued a new technical brochure on its new product, Anaconda Class B Cement Coated Epoxy Magnet wire.

The new product is an epoxy enameled wire with an overcoat of a newly-developed epoxy-type cement. When subjected to the heating cycle, the cement surface softens just enough to form an extra-strong bond to the adjacent wires, providing coils which maintain their shape without ties or braces up to 200C.

For additional information, write *Anaconda Wire & Cable Company, EFL-P6, 25 Broadway, Dept. TEM, New York 4, N. Y.*

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FREE: SEND FOR 20-PAGE BROCHURE in color "Chip Dollars From Your Overhead" with action photos of Fitchburg Chippers used in line clearance work; shows cut-away drawings, specifications. Also ask for 4-pages of case histories describing how these chippers pay off within six months, how they cut man-hours, how to use chips profitably. Write Dept. TEM-19

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Salkum, Washington
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Mt. Vernon Telephone Corp.
Mt. Vernon, Ohio
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Herman, Missouri
Municipal Lighting Dept.
Plattsburgh, New York
New England Power Co.
Boston, Massachusetts
New Jersey Bell Telephone Co.
Vineland, New Jersey
North Dakota Rural Electric Co-op.
Grand Forks, North Dakota
Ohio Central Telephone Corp.
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Pacific Telephone and Telegraph
Northwest Area
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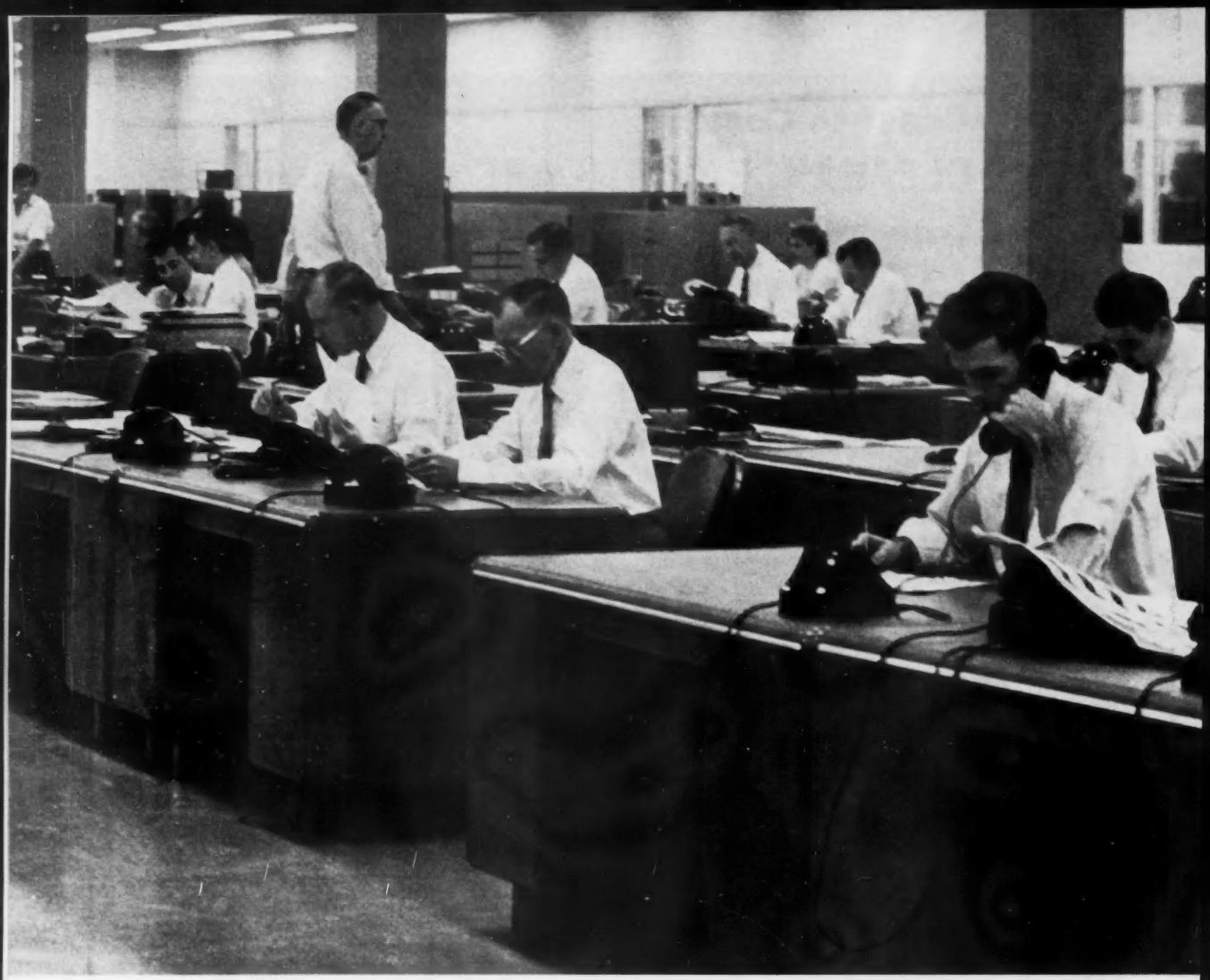

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TYPE 86 PHONE Key telephone provides switchboard convenience for small commercial subscribers. Up to six central office, PBX or private lines. Dial or pushbutton intercom service. Choice of colors.

TRAINING for the PLANT MAN

By JOHN S. REED*

Plant people must know "what" they are doing, "why" they are doing it, and "how" they are to do it.

TELEPHONE companies are vitally interested in plant training programs for employes. In the past, it was considered sufficient if a new man was given perfunctory on-the-job training from his supervisor or fellow workers. If the man could learn to do a fair job of hooking up telephone instruments, running inside wire, and stringing the station drop between the cable terminal or open wire and the house, such knowledge was considered good enough. When he succeeded in learning to climb poles, drive a company truck, read work and installation orders and not make too many mistakes, he was doing fine. If along with this he could solve some trouble cases with help from the test board and maybe some luck, he was considered a pretty good worker.

Although proper on-the-job training has its place in the development of new employes, the introduction of more and more complicated equipment and the need for more experienced personnel to handle the equipment and many new types of wire facilities, make this kind of training inadequate to develop the men for the jobs. Proper training techniques are needed to cope with new ideas. Plant people must know "what" they are doing, "why" they are doing it, and "how" they are to do it. No matter how simple or elaborate the training procedure is, it must be correctly set up to produce the desired results.

**Mr. Reed is technical editor of "Telephone Engineer & Management."*

Purpose of the Training Course

A PROPERLY organized training course is designed to obtain the following results:

(a) Familiarize employes with the standard plant practices of the company.
(b) Encourage the men to obtain technical knowledge of all phases of the telephone business.
(c) Improve the ability of employes to install telephone instruments, and to locate faults in telephone plant and station equipment.
(d) Increase the employes' interest in accident prevention.
(e) Promote better employe relations and customer satisfaction.
(f) Rate the plant employes as to ability, attitude, etc.
(g) Determine what and how much additional training the plant employe may require to meet the job demands.

Basic Training Best For New Plant Employe

IT is very desirable that the new plant employe be started on basic training rather than give him elaborate training that would be beyond his present comprehension and abilities. Basic training develops the plant

Training supervisor setting up case of trouble for trainee to locate and analyze. Telephone instruments are on back of the training board in this illustration.

employe's ability to progress more rapidly and makes it easier for him to take on more advanced training later on. Furthermore, the basic information enables the men to do better jobs of installation and maintenance of the outside plant and station equipment.

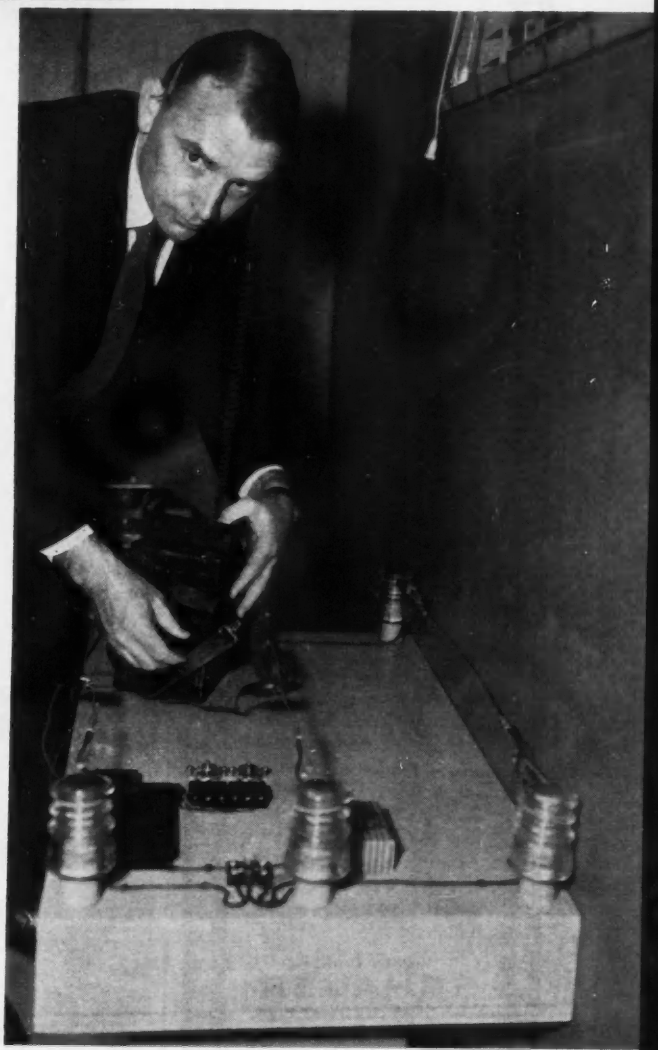
It is, of course, important to have a working knowledge of electrical fundamentals, principally because the telephone equipment depends upon electricity for its operation. The employe needs to know how the telephone equipment depends upon electricity for its operation. The employe needs to know how the telephone equipment works, and a knowledge of electrical fundamentals will help him in learning the operation of the equipment. However, to save time and prevent confusion, no attempt should be made to go into electrical theory beyond the requirements of the work operations.

A typical basic plant training course should cover the following subjects:

(a) Telephone instruments — elements of the telephone, circuit diagram, and wiring of telephone.

(b) Station protection and wiring, drop wire locations, telephone instrument locations, and adjustments of telephone elements, such as ringer, dial, and hook switch springs.

(c) Use of the dial hand test set, inductive fault finder set, voltmeter, and line test panel (in central dial offices).



Demonstrating use of inductive fault finder set on model of open-wire line with resistances.

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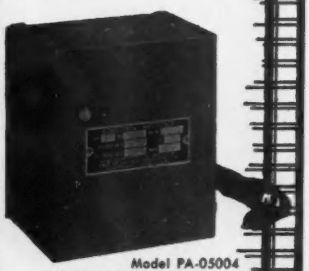

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Schauer Type PA-05004 Battery Eliminator delivers constant, hum-free direct current to the operator's circuit. Equipped with relay for automatically transferring power to stand-by dry cells in the event of AC failure. Standard capacity is 4 volts DC at 0.5 amps. Steel case, for wall mounting is 5½"x6¼"x4".

Rectifier Division
SCHAUER
MANUFACTURING CORP.
4516 Alpine Ave., Cincinnati 42, O.

"PLANT TRAINING PROGRAM"

(Continued from page 69)

(d) Use of cable records and outside plant record maps.
(e) Main distributing frame connections in central dial offices.
(f) Outside plant protection and grounding.
(g) Dial paystation installation and maintenance.
(h) Special telephone equipment and switching keys.
(i) Making out required reports.

The training course with the foregoing listed subjects generally requires 8 to 10 working days for thorough coverage.

Demonstration Equipment

DEMONSTRATION equipment, of course, is important for the training course. Minimum requirements for such equipment are as follows:

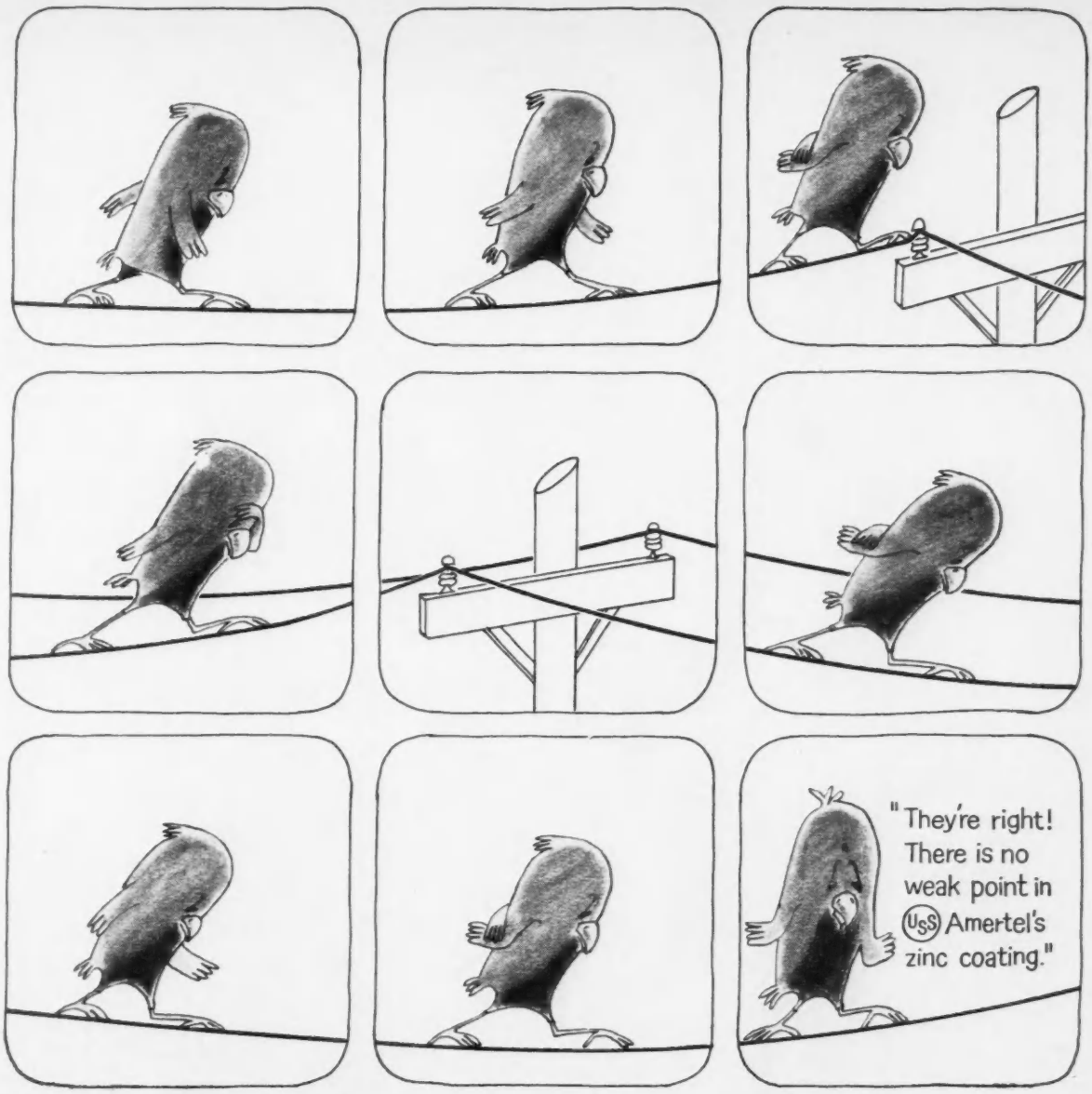
(a) Substation training board with cord and plug.
(b) Practice wiring board for standard hand sets complete with connecting leads.
(c) Dial hand test set.
(d) Volt-ohmmeter with connecting leads.
(e) Apparatus for demonstrating induction coil and capacitor operations.
(f) Demonstration board for use of inductive fault finder test set.
(g) Miscellaneous telephone instruments and paystations standard with the telephone company.
(h) Apparatus with terminal lugs for demonstrating proper soldering techniques.

Furniture for the classroom should consist of chairs, tables, and a blackboard of suitable size. The telephone company may elect to use training aids such as slide projectors and flip charts.

Selection of the Instructor

THE individual selected to conduct the course is given the title of plant training supervisor. He should have had good plant experience and be familiar with standard plant work procedures and practices governing them. He should be able to express himself clearly in his explanations and have a reasonable degree of patience and tolerance in working with the trainees. He should be able to lead the discussions without becoming involved in arguments. He should encourage the trainees to ask questions; since this is an important means of

Explaining circuit of telephone instrument. Plant practices are used as textbooks in the course.



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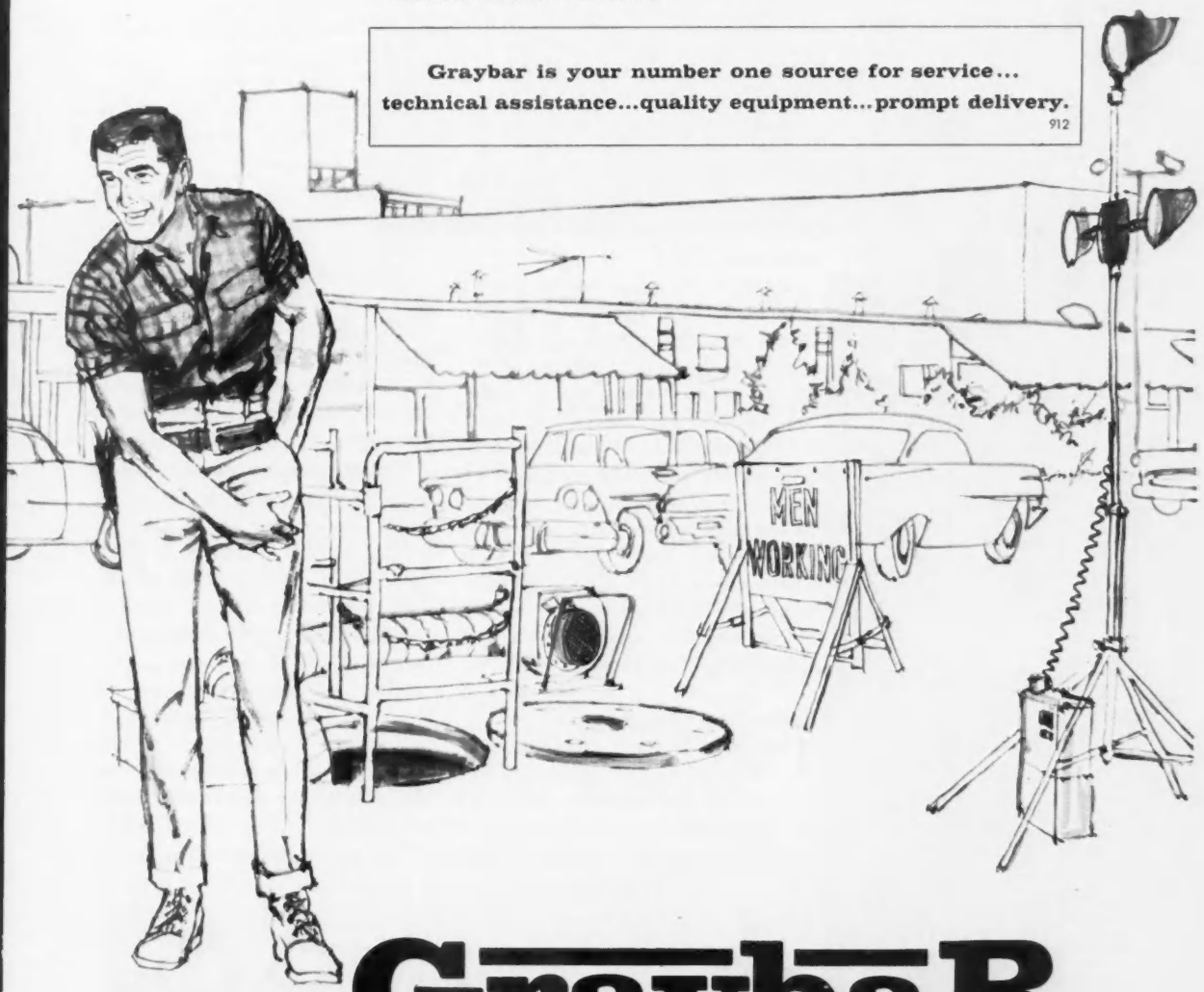

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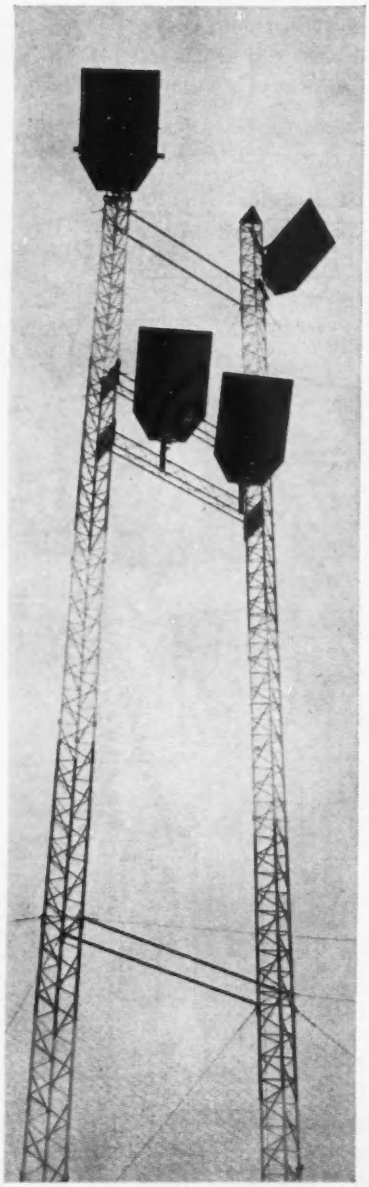

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determining the points that are not clear to them. Ridicule or criticism must be avoided as this can have a discouraging effect on the trainee.

Some companies assign plant supervisors such as service foremen and wire chiefs to temporary plant training work since it gives them valuable experience in dealing with various individuals. Also, according to these companies there is no better method of becoming familiar with standard plant practices than teaching them to others. After several courses, these supervisors practically know the methods by heart. On their return to their regular assignments, the supervisors are more capable of handling their men and getting them to follow safe working procedures in line with company practices. In short, they become better supervisors.

According to one company, good results have been obtained by having one or more experienced plant men work with the training supervisor in the classroom, perhaps one to each two trainees. The experienced men will take charge of each small group and help train them on details such as wiring of equipment and the like. This arrangement will give the training supervisor more time to attend to the group discussions, conduct tests, and handle the necessary paper work. The trainees particularly benefit by getting individual attention.

Rating The Trainees

THE plant training program provides an excellent opportunity to evaluate the new employes and thus determine their value as plant workers. This evaluation is conducted at intervals during the training course; since a single evaluation is not sufficient to determine the trainee's abilities.

A key sheet is used in making the evaluation of each man. It rates him according to the following abilities and qualities:

(a) Oral expression.
(b) Ability to follow instructions.
(c) Initiative and effort.
(d) Workmanship.
(e) Emotional stability.
(f) Ability to learn.
(g) Progress in course.
(h) Written examination. (True or false, or multiple choice type answers).

The trainee is given a rating such as "outstanding," "above average," "average," "below average," and "failing." The percentage points assigned to each rating are 12.5, 10, 7.5, 5.0, and 2.5 for each of the qualities listed above. The over-all rating is obtained by averaging the percentage points for the number of evaluation tests.

Written tests are not satisfactory for plant men as they require considerably more time for the men to prepare and are difficult to grade fairly. It is more desirable to give them tests with "true or false" or "multiple choice" items which they can check off. If the questions are carefully selected for the course material, the tests will be useful in determining if the trainees are actually learning their lessons and will be capable of applying them in their future assignments.

The qualities referred to as oral ex-

Explaining use of volt-ohmeter for station and outside plant testing. Note moving picture projector used to show safety and telephone educational films.

At Last!

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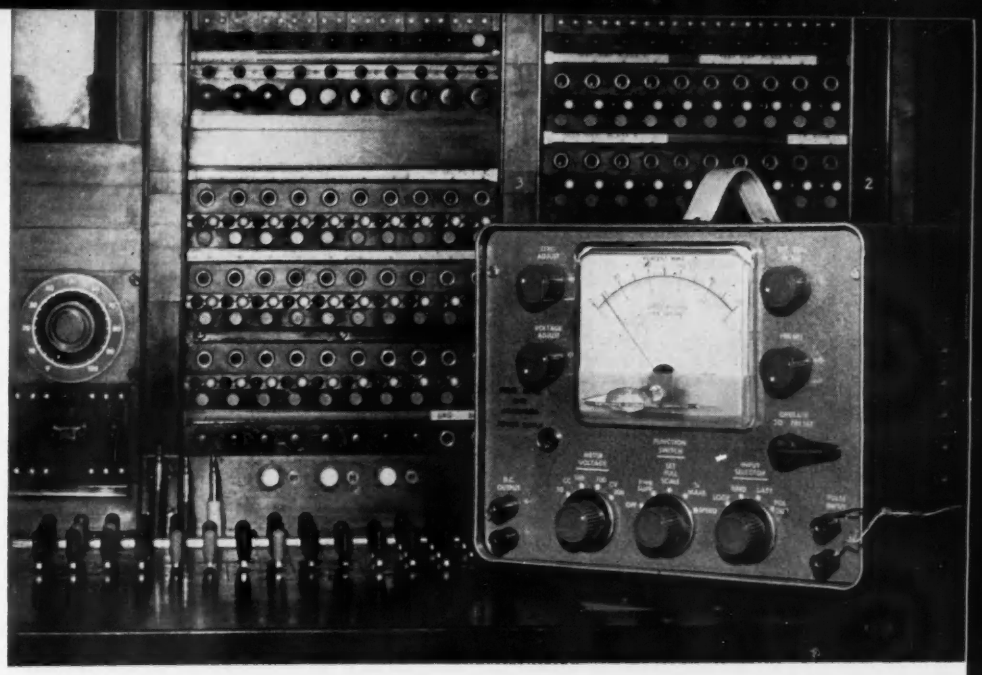
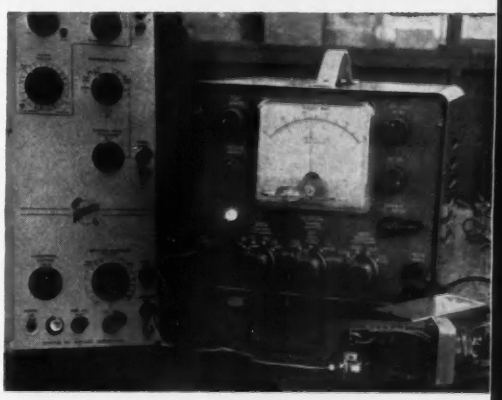


A PULSE METER



that is compact, easily carried, and plugs into the nearest 115 volt, 60 cycle ac wall outlet. Developed by telephone men FOR telephone men, our new pulse meter and power supply measures dial pulses from 0 to 15 pulses per second and percent make from 0 to 100 percent. It will accept loop, ground, battery, carrier, and polar-duplex pulses. Simple in operation, it can be easily carried and used at the test board, the telephone instrument repair bench — any place in the telephone exchange. For that matter, it can easily be moved to the actual subscriber instrument if the need arises. As an added bonus, the PMVPS-1 also gives you a dc power supply continuously variable from 0 to 300 volts. Use it to check transistor circuits, vacuum tube circuits, as a standby power supply—the sky is the limit! Best of all, you will be surprised that so much can be purchased for such a low price!

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pression, ability to follow instructions, initiative and effort, workmanship, etc., are rated according to the judgment and experience of the training supervisor. Much care is needed in judging each trainee on these qualities. Because of this, it is very important that the training supervisor *privately* discuss his evaluation with each trainee and encourage him to improve when he is below average.

It is always desirable to give the trainees some form of recognition for their achievement in completing their training course. This usually takes the form of a certificate which is awarded to each man, usually at a gathering, which may be a luncheon attended by the "graduates" and company officials.

Conclusion

IN DISCUSSING training programs for plant employes, the role of various state telephone associations should not be overlooked. These organizations can and have been conducting training sessions for small telephone companies. Although these sessions are not as elaborate as those in the larger telephone company schools, they have been well received, and the work is continuing.

The fact that so many companies and their employes are keenly interested in the training programs shows that the programs are meeting a definite need. They should be continued and expanded to take care of new developments in the communications arts. — *John S. Reed.*

"WORTH WRITING FOR"

General Purpose Relays

AN ENTIRELY new line of relays is described in Ohmite Manufacturing Company's new Bulletin 166. Termed "GR" relays, these units feature simple, uncomplicated construction and offer flexibility for making connections or mounting. The bulletin describes enclosures and plate and latching versions of these units. A large list of stock units with prices is also incorporated in the literature. Request Bulletin 166 from *Ohmite Manufacturing Company, 3653 Howard Street, Dept. TEM, Skokie, Illinois.*

Installers Body

YORK BODY & Equipment Company has announced a new brochure describing its new Model YU-77 Telephone Installers Body. Unit can be mounted on 40" to 48" cab to axle dimension.

For complete descriptive information write to *York Body & Equipment Co., P. O. Box 446, Dept. TEM, York, Pa.*

P-A-B-X Circulars

NEW SALES circulars on the Type 40-A and 80A P-A-B-X's have been issued by Automatic Electric Company. The Type 40A is a 40-phone system accommodating up to six inside and ten outside calls at one time. The Type 80A is an 80 phone system, capable of handling up to twelve inside and 20 outside calls.

For more detailed information on the Type 40A and 80A P-A-B-X units, request circulars 1989 and 1990 from *Automatic Electric Sales Corp., Dept. TEM, Northlake, Illinois.*

Filing Cabinets

NEW literature describing a new open-type steel filing cabinet for filing engineering drawings, blueprints, and maps — utilizing a special dowel system on sliding tracks — is available from the manufacturer, *Dancer Stikfile Company, P. O. Box 10221, Dept. TEM, Houston 18, Texas.*

Valve Bulletin

A PNEUMATIC circuitry component, Mite 75, which fills an industry need by providing positive, instantaneous control in air and nontoxic gas service applications, is described in a new bulletin.

The bulletin gives complete specifications, materials of construction, dimensions, and operational data. For free copy, write *G. W. Dahl Co., Inc., 86 Tupelo Street, Dept. TEM, Bristol, Rhode Island.*

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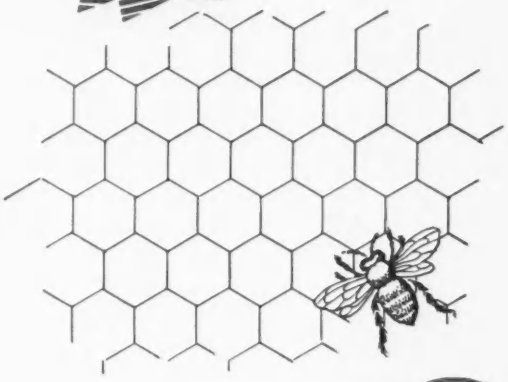

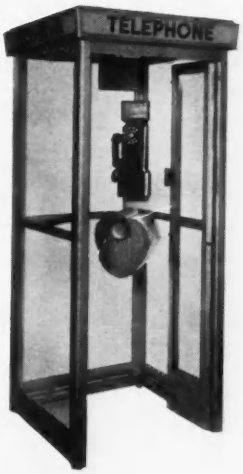

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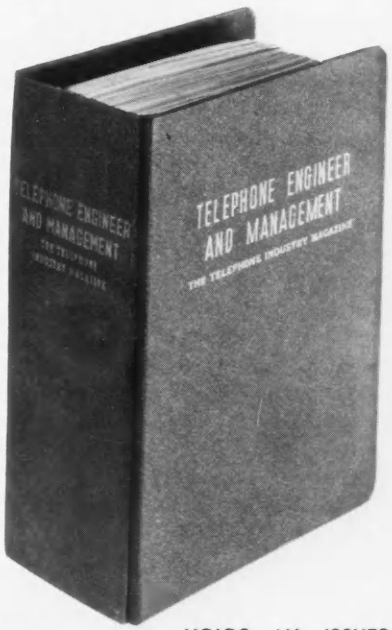

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"Protective Measures"

(Continued from page 45)

extent, are deferred to a convenient time for the splicers to handle the work. Larger or numerous sheath breaks cause an excessive drop in the pressure, which calls for somewhat more prompt attention to close the openings. Gas pressure switches are placed at strategic points in the larger exchanges to detect these pressure drops and these are checked with a voltmeter at regular intervals from the testboard. An excessive pressure drop causes operation of a gas pressure switch at or near the opening which sets up an alarm condition by connecting a high resistance (270,000 ohms) across a working cable pair. This high resistance shunt is detected by the voltmeter test. It does not interfere with the use of the line by the subscriber.

Nitrogen gas tank in unattended CDO for pressurizing cable in small town.

A testman makes voltmeter tests of telephone lines having pressure switches on them at regular intervals to detect the presence of an operated pressure switch. An operated switch need not be attended to immediately, but repair work may be scheduled at a time when a cable splicing crew can handle the work during regular working hours. Meanwhile, the escaping air at the break keeps out moisture, and telephone service remains unaffected, even in extremely wet weather.

On important toll and trunk cables, contactors are installed, which send an alarm to the central office when a serious sheath break occurs and cable splicers are promptly dispatched to repair the damage, even though the air under pressure is keeping out the moisture. Contactors operate a similar way to gas pressure switches. They operate an alarm in the central office, which requires immediate attention to clear the fault and restore the pressure to normal.

Since moisture is not entering the cable, the splicers do not rely on electrical tests to locate the sheath break. Instead, they make use of a portable pressure gauge of high accuracy to check pressure readings at valves inserted at intervals along the cable. As the location of a sheath break is approached, the pressure readings will be lower at each valve toward the break, and higher at each valve away from the fault. From these pressure drops, the splicers determine the probable location of the leak and then check for the exact location by spraying the sheath of the cable with a soap solution. The air coming out of the sheath opening causes a mass of soap bubbles to form and thus reveals the location of the break.

To maintain the air pressure in the cables within specified limits, and provide means for supervising the cable system for pressure variations, the cables are dammed or blocked at specific points in the system, and pressure valves and gas pressure switches or contactors are installed on the cable. In addition, a metering panel is provided at the air dryer unit to measure the amount of air consumed and to indicate the rate of air flow into each cable.

The cables are dammed at specific locations with plugs of epoxy-resin to separate them into pressurizing sections. Pressure plugs are also used to seal off cable laterals that are not to be pressurized and stubs of cable terminals that are not gas tight.

Pressure plugs with by-pass connection and shut-off valve are also employed to isolate an aerial cable section from an underground cable section. There are temperature variations between the aerial and underground cable sections and these variations cause fluctuations of gas pressure, which would interfere with tests to determine leak locations.

Pressure testing valves enable taking pressure readings to locate leaks and to check the operation of pressure plugs and gas pressure switches. They are generally installed at each pressure switch location, on each side of intermediate plugs, on the pressure side of plugs at the end of pressurizing sections, and at intervals of about 3,000 feet throughout the pressurizing section. The valves may also be used to boost low pressure in a cable with nitrogen gas from a cylinder, when necessary.

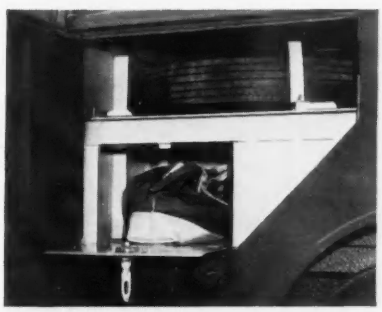
The metering panel at the air dryer consists of a volume recording gas meter and direct reading air rate indicators. These meters are used to monitor and control the air flow into the cable. A daily record is kept of all readings of the gas meter, and air rate indicators. Readings below normal may indicate one or more leaks in the cable system and the plant personnel are alerted to this condition so that the leaks can be located, and the repairs made when a splicer is available to do the job.

The air dryer unit operates by drawing in atmospheric air, compressing the air, and delivering it to a storage tank where it is cooled to just above freezing, causing it to lose a large part of its moisture content. The resulting dry air released into the cable system has a relative humidity of less than two per cent.

In the small exchanges, pressurizing of the cable is accomplished more practically by installing a cylinder of nitrogen in the office and connecting it through a regulator to the cable system. The regulator holds the pressure down to about ten pounds per square inch, as indicated by a pressure gauge on the unit. An additional cylinder may be installed in a cable lead, usually at the outer end

HOLAN'S HU-76 Telephone Installers' Body

In addition to the double-doored rear entry to spacious drawers and shelves, the right side compartment contains a saw rack, extra coil of wire for PR reel, drawer for inside wire and a tool bag/spec book shelf.



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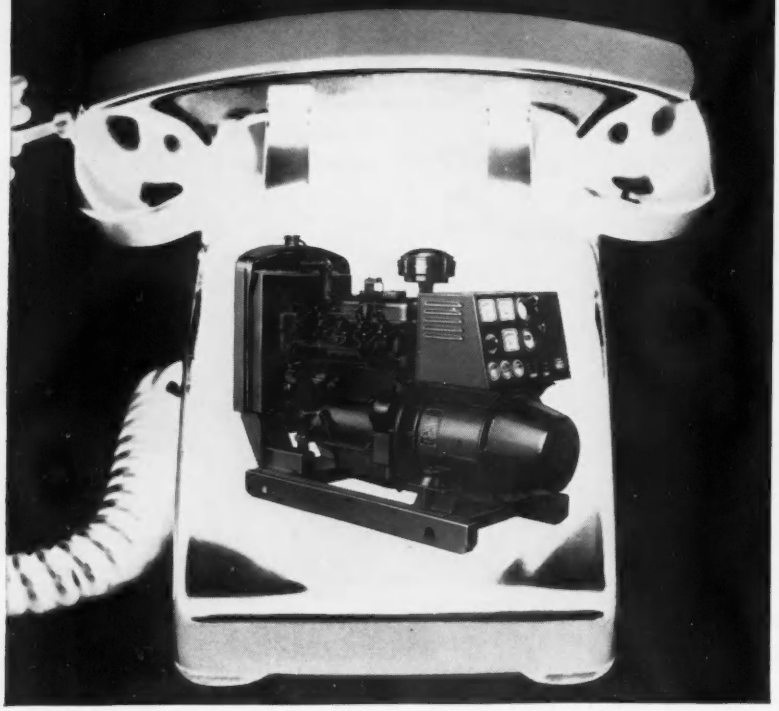

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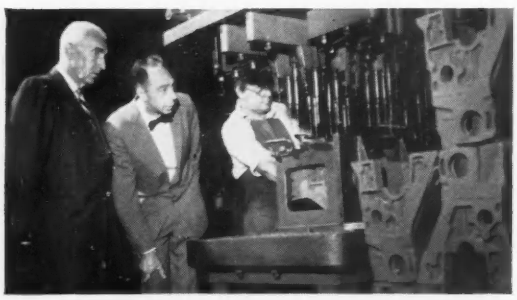

F. K. Devoe, center, in charge of generator procurement for A.T.&T., tours Kohler Engine and Electric Plant with Fred Nelson of Kohler Co.

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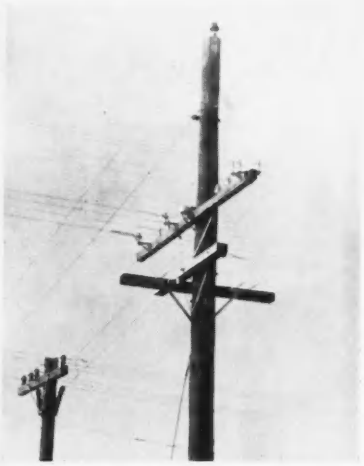

Protecting open-wire circuits at point where circuits enter joint-use section with power wires. Protector is multiple block type for five circuits

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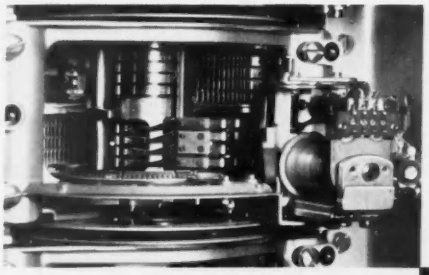

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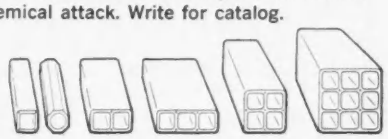

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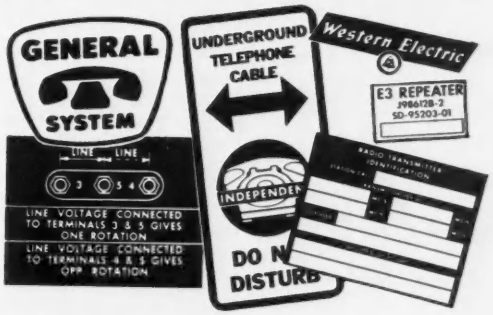

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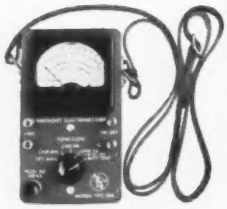

- Level Ranges: 0 dbm to —20 dbm and —10 dbm to —30 dbm
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- Battery Check
- Wide Frequency Response

Other instruments available from Northeast Electronics Corporation include Single Frequency and Multi-Frequency Reference Tone Generators, Loop Around Transmission Test Systems, Fault Locator, Singing Point Test Set, Program Amplifiers, and RF Power Monitors.

IN CANADA: TELE-RADIO SYSTEMS LIMITED/3633 Dundas St. W., Toronto 9, Ontario/Ro. 2-8224 Area Code 416

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NORTHEAST ELECTRONICS CORPORATION
AIRPORT ROAD, CONCORD, NEW HAMPSHIRE

water pipe ground (at least 10 foot length of buried metallic pipe) or connection to a multigrounded neutral power grounding conductor must be made. The latter connection is accomplished by driving a telephone ground rod and running a heavy gauge bond wire to connect the power and telephone ground rods. If these conditions cannot be met, a regular fused protector must be used.

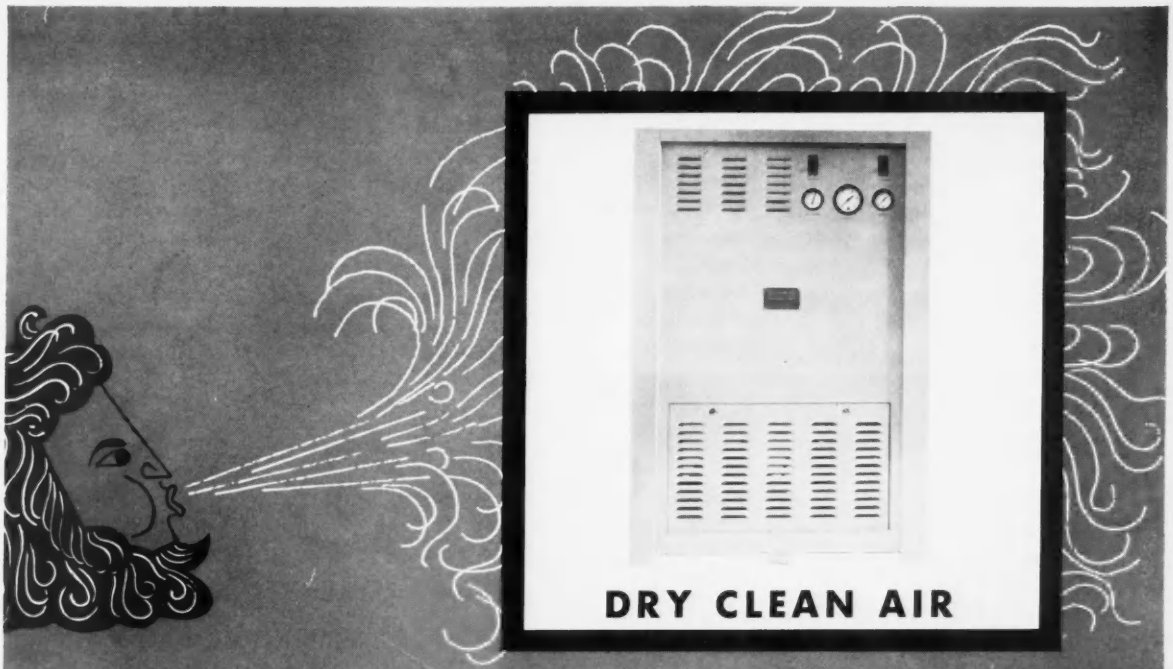
The use of fuseless type protectors has resulted in considerable savings. The protector costs less than the fused type because of its simpler and smaller construction. In addition, the elimination of the station fuses reduces to a marked degree the number of station visits to replace operated fuses. This is particularly true in areas where lightning storms are frequent and continual fuse operation becomes an expensive nuisance.

For effective protection of telephone equipment and circuits, it is important to limit the time the power voltages are applied to the telephone circuits. When duration of the contact is reduced, safety to personnel is increased and the damage is reduced. Fault currents must be high with respect to load currents to operate power protective devices quickly. Thus, fault current impedances must be low. The portion of telephone plant through which a fault current might flow must be of low impedance and have adequate current carrying capacity to assure the prompt de-energization of the power line.

Establishing Common Grounding Network

MOST of the telephone cable in towns is carried on the same poles with power distribution lines for efficient use of supporting structures and to obtain good appearance of the plant by eliminating paralleling construction of pole lines on opposite sides of streets and alleys.

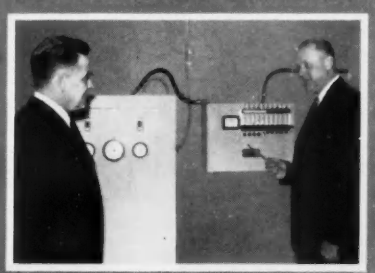
In spite of steps taken to maintain proper clearances between the power and telephone facilities on the same poles and to provide adequate strength of the lines, unusually severe storm conditions may cause some overhead power wires to break. In some cases,



. . . at work for HIGHLAND TELEPHONE Co.

The Highland Telephone Company, of Monroe, N. Y. has recently completed several installations of PUREGAS pressurizing equipment to improve service and reduce maintenance costs on their telephone circuits, serving 11,640 stations.

Highland Telephone thus has become another in the growing number of independent telephone companies across the nation that are capitalizing on the advantages of continuous feed pressure systems to dramatically reduce moisture-caused service difficulties in their telephone cables.



President F. S. Florance and Plant Supervisor, C. A. Smith inspect their PUREGAS Air Dryer installation.

Here, in brief, are a few of the advantages of PUREGAS Cable Pressurization:

- *Lower Maintenance Costs*
- *Better Customer Service*
- *Prompt Notice of Sheath Breaks*
- *Longer Cable Life*

To find out how a PUREGAS Pressurizing Program can just about eliminate emergencies caused by sheath breaks and moisture damage . . . Check-off the bulletins you would like, and send this page to us with your name and address.

- ☐ Data Sheets on Model 750, 1500, and 5000 Air Dryers
- ☐ "Why Cables Should Be Pressurized"
- ☐ "Desert Dry Air . . . a boom to the Telephone Industry"
- ☐ Cost Comparison . . . Air Dryers vs Nitrogen
- ☐ "Meter Panels for Continuous Feed Pressure Systems"

PUREGAS EQUIPMENT CORP.

578 Oak Street, Copiague, L. I., N. Y.

PEC

an energized conductor may fall across the telephone cable, burning it and the messenger.

The serious thing about this kind of damage is that it spreads as the current from the power wire follows the return path through ground to its source. When a high voltage line is involved, the insulation in the cable conductors will break down at various points along the cable, sometimes extending to quite a distance. Such extensive damage is costly, since it is necessary to locate these breakdown points, open the cable sheaths, repair the damage, and then close up the openings with trouble sleeves. Also protectors at subscribers' stations may permanently break down, requiring the dispatching of troublemen to replace the operated protector units.

Damage of this kind can be substantially reduced by arranging with the power company to establish a grounding network in the towns involved. This common grounding is obtained by bonding cable messengers to the grounding conductors of the power company's neutral wires. Such bonds are made at intervals not to exceed 1,000 feet, to sectionalize power contacts involving the cable. In placing these bonds, an average of 500 feet, with a minimum of 300 feet between the bonds, is specified.

That the common grounding network pays dividends is proved by results experienced in storms by a telephone company in the Middle West. In one storm, a wet-snow blizzard brought down power wires in the area, burning and damaging telephone cables in twenty different locations. Yet the damage was relatively minor. The faults were confined to the points of contacts with the power wires and in each case there was no extensive stretch of trouble.

In one situation, a 25-pair cable and 6,000-pound messenger were severed by a 4,120-volt power conductor falling on them. This trouble was quickly repaired by resplicing the cable and reconnecting the messenger with a splicing device. The ground path through the messenger and cable sheath to the ground bonds at the ends of the section was adequate to return the power line current without causing breakdowns inside the cable.

Open wire lines in joint construction with high voltage power distribution systems employ special high voltage protectors with ground electrodes connected to the grounding conductors of multigrounded neutral power lines. These protectors are designed to reduce the voltage at a power contact to a value (3,000 volts) that can be handled by protective equipment at buffer points (1,000-volt breakdown) and at junctions of the open wire with the cable (600-volt breakdown), or by station protectors.

Inspector and helper checking condition of buffer protection ground. Test leads run to ground resistance measuring set in car.

Hold It Please!

In your territory lies part of the cable in the great web of circuits carrying local and long distance telephone calls and radio and TV programs over America. When you see it, this cable may not look very impressive, just a little metal and some insulating material which is placed a couple of feet below ground in the soil or perhaps in a tile duct below a street, but (and what an important but!) through those slender wires speed:

1. Vital messages of the Federal Government, of business, of the police, and of the news services.
2. Emergency messages or those of everyday living, exchanged by your neighbors and all the men and women of this country.
3. Music, news, and entertainment which you get by twisting the dial on your TV or radio set.

Pretty important, these circuits! Yet all too frequently, work carried on at street crossings and along roadways damages this communications highway of America. A pneumatic drill piercing the wrong spot, for instance, and any message traveling along that cable highway is immediately interrupted or delayed.

Naturally, no one means to cause this injury to personal or business life. And over the years the telephone company has enjoyed the cooperation of thousands in protecting the public against such cut-offs. Nonetheless, accidents to these cables continue to happen.

Will you cooperate with us to keep these messages safe? It's easy to help. If you plan any digging, bulldozing, pipe driving, major or minor construction activities in the vicinity of underground telephone plant, will you please notify or call collect:

The Telephone Company
(Telephone No. .....)

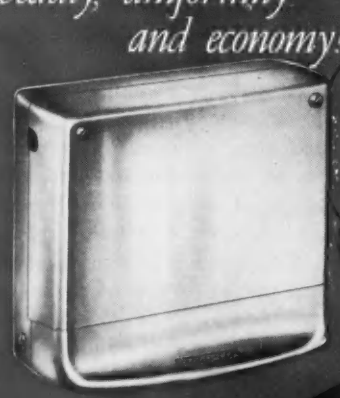
Then tell us what you plan to do so that we may send a representative at once (at no cost to you) to show you the exact location of our underground cable. This will help you to go ahead with your own work without delay and without damaging telephone company property.

HELP US KEEP THOSE MESSAGES GOING THROUGH

Note: If you are not already supplied with the latest maps showing the general location of underground telephone plant in the area where you work, we will be glad to provide them.

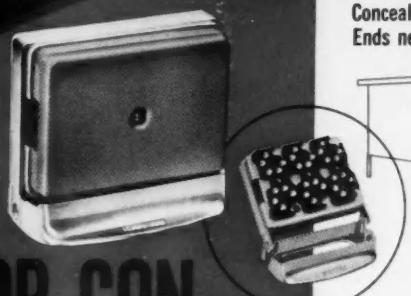
EXHIBIT A.

beauty, uniformity and economy!



MODEL 103 encloses Amphenol plugs and jacks

MODEL 102 WITH STANDARD TELEPHONE COMPANY COVER



FLOOR-CON allows all telephone work to be completed in advance of moving. Approved and specified by telephone companies, FLOOR-CON is used exclusively in many large buildings in business, industry and government. Attaches to all makes of underfloor ducts, floor boxes and single conduits through the floor. All necessary fittings will be supplied to adapt Floor-Con to your particular duct system or Floor Installation — specify type and make in use.

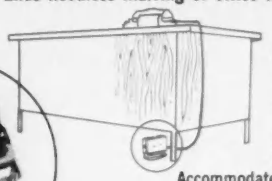
Model 103 includes the matching cover in chrome or brass satin finish. The cover encloses the amphenol plugs and jacks when used with key telephone sets or other complex equipment.

Additional connecting blocks and miscellaneous equipment can be mounted on the back of all models.

IF NO CONDUITS ARE PROVIDED, FLOOR-CON CAN BE SCREWED DIRECTLY TO THE FLOOR. NO FITTINGS ARE NECESSARY.

FLOOR-CON TELEPHONE FLOOR CONNECTOR

Conceals all wiring—Desks are free from telephone equipment
Ends needless marring of office furniture PAT. #2854166



Model 102— Chrome or brass satin finish. Accommodates 3 44A Connecting Blocks.

Model 104 (Not Shown) Chrome or brass satin finish. Accommodates 4 44A Connecting Blocks.

For catalog information and prices, write:

FLOOR-CON 759 NORTH SPRING STREET / LOS ANGELES 12, CALIFORNIA / MAdison 4-5400

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GRAYBAR ELECTRIC COMPANY

ROWCO BRUSHKING

WORLD'S BEST SELLING BRUSHCUTTER

ECONOMICAL BRUSH CLEARANCE STARTS WITH NEW MODEL 660

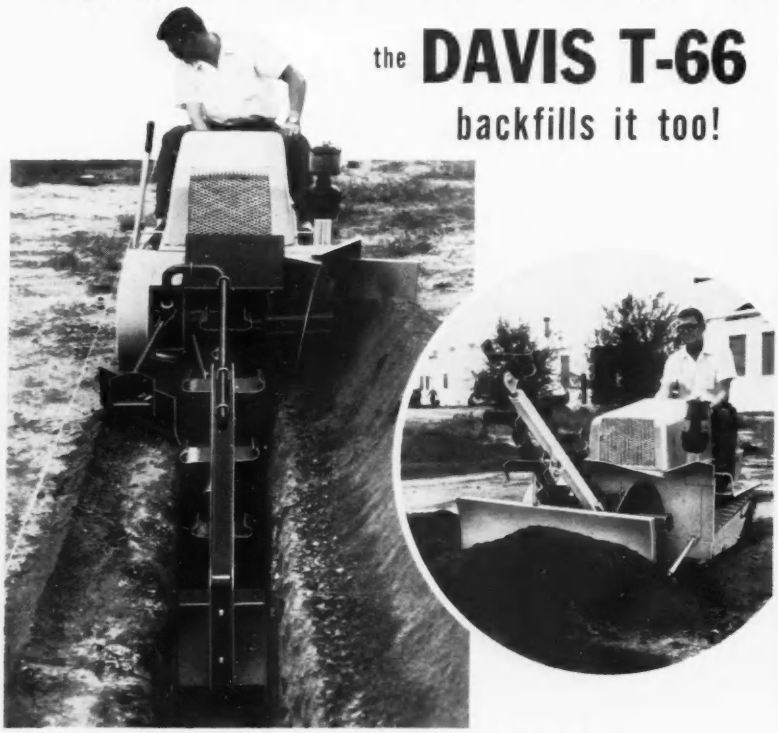
New Brushking Model 660 — now 50% more powerful with 3 HP *throughout* — cuts clearance and maintenance costs as it cuts brush, saplings, trees up to 9". Does the work of 6 men. Anyone can operate . . . easily, safely. Guaranteed shatterproof 10" blade. Available with trimmer-cutter attachment to clear heavy grass and weeds.

For name of your nearest distributor, write:

ROWCO MFG. CO., INC. DEPT. 151
48 EMERALD ST., KEENE, N.H.

Digging the ditch is only half the job...

the DAVIS T-66 backfills it too!



Coast to Coast... Border to Border... and in many foreign countries Owners Acclaim the T-66!

When you've dug a trench you're only half done; you have to backfill it, too! Only the Davis T-66 does the whole job, and does it with profit-making performance — because it is **designed** as a trencher and a backfiller. Just ask any user. Large track shoes, a unique hydraulic drive, and the T-66's extra-heavy 1400-lb. weight give ground-gripping traction for accurate ditching control and backfilling power. No erratic rubber-tire bounce. Hydraulic boom lets you have absolute control over digging depth as well as backfill blade. Instant Forward/Reverse provides unmatched maneuverability for backfilling. It digs 4″ wide to **66″ deep**, or **12″ wide**, 30″ deep, and at varying widths and depths in between. Attachments available for trenches **16″ wide**, 24″ deep and **flush** alongside walls or fences. You can buy with confidence because the T-66 is built to withstand the severest tests, and is produced by men who are leaders in the design of digging equipment.

the DAVIS HUSTLER UTILITY TRAILER

This 2000-lb. capacity, tilt-bed trailer for the T-66 and other loads has low center-of-gravity stability and load equalization suspension system. Sides optional.

the DAVIS PUP TRENCHER *Self-Propelled*

Digs by itself. This self-propelled trencher is driven by a six-speed winch mechanism. A productive tool for trenches 2″-3″ wide to 36″ deep, or 4″ wide, 18″ deep.

We Welcome Competitive Demonstrations!

The performance of the T-66 creates confidence that invites comparison so you know why it is the standard bearer of trencher value. Ask about its 90-day unconditional guarantee!

DAVIS MFG. INC.
1514 S. McLean Blvd., Wichita 13, Kan.

Please send me description T-66 literature and the name of my DAVIS dealer____. I am also interested in the Davis Pup____ Davis Hustler____.

NAME_____

ADDRESS_____

TOWN_____ STATE_____

D2-261

Buffer protection (1,000-volt breakdown) provides additional protection for the entrance cable at the junctions with the open wire. This protection is installed within three spans to one-mile of the junction and will reduce high-voltage and lightning currents to the extent where the remaining currents can be easily handled by the junction protective apparatus. A minimum of 25 ohms resistance of the ground is required at the buffer protector points. The junction protection grounds and the high-voltage protector grounds should also be not more than 25 ohms resistance.

The maintenance of low resistance grounds at central offices is equally important. In this case, the maximum ground resistance should not be higher than five ohms. Many companies have established the practice of annually testing all central office, buffer, high-voltage, and junction protection grounds to make sure that their resistances do not exceed the specified limits.

Protecting Buried Plant

IN CITIES, telephone service is furnished by an extensive system of underground cables that must be protected at all times. Accidental damage may result from as simple an act as a homeowner digging a fence post hole, or a contractor clearing ground with a bulldozer, or a plumber installing water pipes or a sewer system.

Telephone employes can help prevent cable breaks, with the resulting disruption to service, by calling an assigned telephone number (usually the testboard) whenever they note any digging where underground telephone facilities may exist.

Warning signs are installed along the route of a buried cable in isolated locations to caution construction workers to call the telephone company before digging in the vicinity so a company representative can be dispatched to help determine the cable location and depth and instruct the workmen where and how to dig to avoid the buried facility.

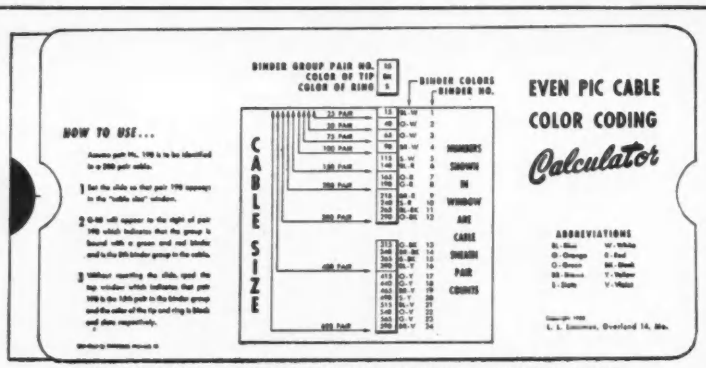
Illustrated brochures sent to all construction firms, plumbers, and others who may do excavating, dig-

In the time it takes this to make 1 hole in concrete

this makes 5 permanent fastenings

The timesaver on the right is called Shure-Set.® Instead of making holes in concrete (slowly) it makes permanent fastenings (quickly). This easily. Insert a Shure-Set fastener in one end. Strike the other end with a hammer. Less than 5 taps and the fastener permanently anchors a 2 x 4 – or a duct strap, or a junction box, or most anything – to concrete. No drilling. No expansion devices. No powder charge. And no sweat. If your time is money – Shure-Set saves a lot of both – it'll pay for itself first day out on the job. Shure-Set tools and fasteners are available from your local Ramset or Shure-Set dealer. He's listed in the Yellow Pages, under "Tools."

Ramset WINCHESTER-WESTERN DIVISION **Olin**
303-I Winchester Ave., New Haven 4, Conn.



THE EVEN PIC CABLE COLOR CODING CALCULATOR

Use this slide-chart Calculator to convert color coding of Polyethylene Insulated Conductor (PIC) cables into cable pair counts, or vice versa. You don't have to have a degree in engineering to operate this device. A housewife, with no knowledge of telephone cable can operate it.

To identify pair #190 in a 600 pair cable merely set the slide-chart and in less than 10 seconds the answer peeps through little windows. Amazing speed! Amazing accuracy too, because the windows are so arranged that only 4% of the data on the cables are shown at one setting.

Don't dig through pages of specifications when you can carry this spec. book in your shirt pocket. Order your PIC Cable Color Coding Calculators today at a cost of $2.00.

slide-chart *Calculators*

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Casual living under the Sun!

Wiener Roast and Splash Party Every Sunday Nite. Games — Mon.-Fri.

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- Two double beds in each room
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ging or drilling work are helpful in reminding these people of the procedure that should be followed before performing any work of this kind. The message shown in *Exhibit A* is contained in a typical brochure.

Conclusion

THIS article has covered only the most important protective measures needed in preserving the outside plant of a telephone company. There are other measures, such as protection of underground cables from corrosion of the lead sheath resulting from electrolysis which can be important, depending on the prevalance of the conditions causing the deterioration. The company must take all protective procedures into consideration when these will materially reduce costs.

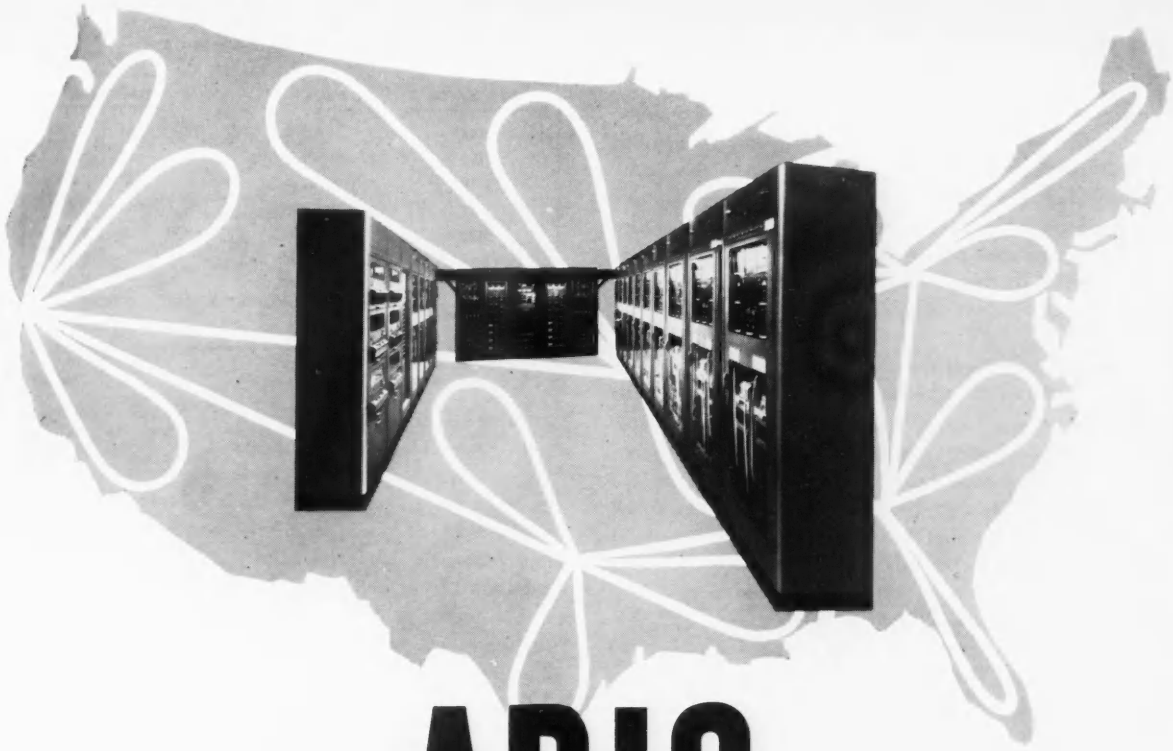
Preventive maintenance goes hand in hand with protective measures and should always be included in the company's over-all program of rendering good telephone service at minimum cost. — *Richard Allen.*

FOR YOUR BOOKSHELF

"Optimum Use of Engineering Talent;" Published by American Management Association, 1515 Broadway, Dept. TE&M, New York 36, N. Y.; 416 pages; cloth bound; price $9.00; AMA members: $6.00.

This new book is the first comprehensive analysis of the management of engineers. Thirty-one executives describe their effective management techniques and their practical solutions for the unique problems of the manager of technical personnel. Facing up to the very real and continuing shortage of engineers, these managers make optimum use of engineering skills and talent that are available.

Representatives of leading companies discuss every phase of effective engineering management — from basic objectives, responsibilities, and organization of the engineering division to recruiting and selection, compensation, and other subjects.



ADIS

Communications breakthrough

New Teletype Automatic Data Interchange System (ADIS) now enables the Federal Aviation Agency to interchange aviation weather data coast-to-coast ten times faster than ever before.

With this new electronic message switching system, the FAA effects a major advance in the speed, scope and flexibility of its weather communication service—which supports all civil and extensive military aviation in the United States.

Nucleus of the system is a series of five Interchange Centers, located in Kansas City, Cleveland, Atlanta, Fort Worth and San Francisco. Each of these acts as a clearing house for a number of area circuits, or outlying "loops," collecting data from observation points on these loops and providing the area circuits with data from other parts of the country.

Teletype electronic communications equipment at the Interchange Centers carries out an automatic program of sequentially calling data-originating stations, classifying messages by priority, selecting only those weather items wanted at regional stations, and delivering them to the area circuits—while maintaining the ability to handle emergency traffic when required.

Ultra-fast communication between Interchange Centers is provided by Teletype punched tape equipment operating at 850 words per minute, utilizing the Data-Phone concept. Stations on outlying loops are equipped with Teletype Model 28 page printer and punched tape units. Speed-conversion equipment permits automatic interoperation between the national circuit and the local loops. Thus the new system, which serves some 2,400 locations, can report weather conditions from any part of the country in a matter of minutes.

The FAA, through the years, has followed a program of continually upgrading its facilities to meet the needs of the nation's growing air traffic. Teletype Corporation is proud of its part in providing communications equipment for this vital service.

TELETYPE®
CORPORATION • SUBSIDIARY OF *Western Electric Company* INC.
Dept. 66-J, 5555 Touhy Avenue • Skokie, Illinois

"Subscriber Loop Plant Design"

(Continued from page 52)

major splices, location of manholes, long river crossings, etc., and deviations made in the actual point where the cable gauge change occurs. If any of the factors mentioned dictate a change in the point of gauge change, such deviation should always be made to move the point toward rather than away from the central office. This will insure that the loop involved will remain within the office conductor loop resistance limit.

Transmission Performance

ONCE the cable make-up has been determined by the "Resistance Design" method, the resultant transmission performance must be checked unless maximum loading is used on all cable pairs longer than about 18.0 kilofeet and unless efficiency sets are used at all stations beyond about 10.0 kilofeet from the central office. This can be calculated for any combination of cable gauges and open wire for a given design loop length, using the variable loop loss factor method.

Loop loss factors have been prepared by the Bell System and the REA for different types of exchange operation such as manual 24-volt, manual and dial 48-volt, and step-by-step and crossbar 48-volt. These factors are arranged in tables by loop lengths and type of loop facilities (see *Table One*), and complete copies of these tables are available in Bell System Practices and REA Telephone Engineering and Construction Manuals.

Each column of these tables assumes a given average mutual pair capacitance as well as resistance or gauge, and the factors are for the older AST subscriber sets and for nonloaded loops. Loop losses for the cases where high-efficiency sets are specified may be obtained by subtracting from the older AST loop loss the gain for the high-efficiency set as given in *Figure Two*. And likewise, where VF loading is specified, the resultant loading gain is calculated from the loading gain data given in *Table Two*. This loading gain is subtracted from the nonloaded loop loss to obtain the loop loss for a loaded loop. Also, the loop resistance of the loading coils is subtracted from the total allowable cable loop resistance.

The results of the loop design are usually placed on the associated workprints in a transmission block form. This form provides space for both the resistance calculation as well as the transmission calculation and has space for related items such as long line equipment, loading, bridged taps, and high-efficiency subsets. To illustrate the use of the form consider the 1,000-ohm, 25.0-kilofeet loop previously designed and shown in *Figure Four*.

The resultant loop loss with the older AST set does not meet the requirement for a maximum loss of —2 DB (T+R)/2 (see *Figure No. 3A*). The first step to be taken to improve transmission on a cable loop of this length is to VF load the cable. Loading gain is based upon the number of load points involved along with

TABLE TWO: — LOOP LOADING GAIN

TYPE LOADING	GAUGE	LOADING GAIN
H88	19	1.1N-1.5 DB
H88	22, 24, 26	1.5N-1.5 DB
H88	16B UNDGND	.65N-1.5 DB
H88	19B UNDGND	1.1N-1.5 DB
H88	19 MDW	1.0N-1.5 DB
H88	14 RURAL C (.064")	1.4N-1.5 DB

N = Number of Load Points

TABLE ONE: — LOOP LOSS FACTORS (DB PER KF)

F1A-AST or EQUIV. SET — (T+R)/2 SxS & X-BAR 48V EXCH

LOOP LENGTH (KF)	EXCHANGE CABLE 26 GA.	24 GA.	22 GA.	19 GA.	OPEN WIRE .109 FE	.104CUW 40%	.104 CU
.5	—17.625	—17.862	—18.077	—18.155	—17.805	—17.985	—18.005
1.0	— 8.607	— 8.838	— 9.041	— 9.121	— 8.811	— 8.984	— 9.004
5.0	— 1.280	— 1.510	— 1.680	— 1.790	— 1.628	— 1.782	— 1.798
10.0	— .288	— .487	— .633	— .760	— .737	— .879	— 1.898
15.0	.064	— .102	— .253	— .376	— .443	— .576	— .594
20.0	.240	.093	— .062	— .171	— .296	— .420	— .444
25.0	.337	.191	.049	— .053	— .212	— .327	— .353
30.0	.395	.258	.119	.015	— .158	— .269	— .293
35.0	.440	.303	.168	.060	— .120	— .227	— .248
40.0	.472	.336	.203	.093	— .093	— .194	— .215
45.0	.497	.363	.230	.116	— .073	— .167	— .189
50.0	.516	.380	.252	.133	— .056	— .145	— .168
60.0	.544	.413	.284	.160	— .033	— .114	— .136
70.0	.563	.433	.307	.179	— .015	— .093	— .114
80.0	.577	.447	.324	.195	— .003	— .076	— .098
90.0	.588	.459	.335	.205	.007	— .064	— .085

Here's a new Tool for your BOOK KIT!

TELEPHONE ENGINEER & MANAGEMENT's new "Telephone Handbook for Managers and Plantmen" is the first of a new series of telephone reference books containing selected reprints of TE&M's exclusive feature articles.

Edited by John G. Reynolds and John S. Reed, this new 116-page book presents articles discussing:

- Placing Messenger Strand For Supporting Cable.
- Underground Cable Plant.
- Modern Station Installation.
- Plant Maintenance Procedures.
- Correction of Noise Conditions.
- Pole Yard Arrangements.
- Pole Moving Procedures.
- Rural Distribution Wire.
- Regrouping Rural Subscribers.
- One-Party Service For Rural Subscribers.
- The Vanishing Eight Party Line.

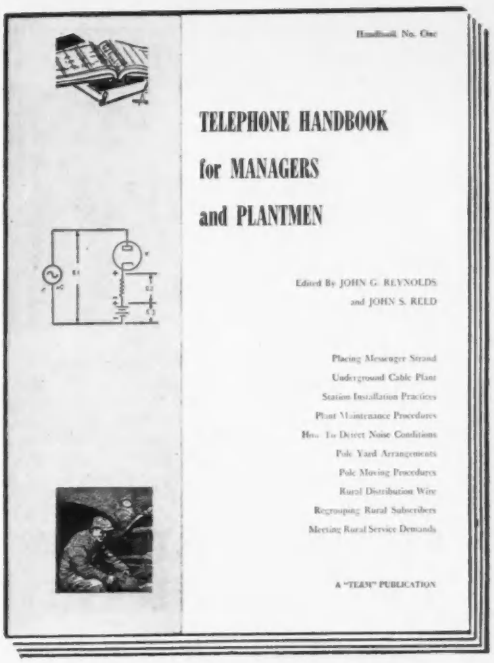
Thoroughly illustrated with tables, charts, and on-the-job photographs, the contents of *"Telephone Engineer & Management's Handbook For Managers and Plantmen"* have been carefully selected to provide each user of the handbook with "how-to-do-it" information on a wide variety of telephone subjects. Through concisely written, easy-to-understand articles, the handbook will provide ready answers for questions that may arise concerning — Desk Instrument Mounting; Drop Distribution; Drop Entrances; Drop Wire Fixtures; Drop Wire Locations; Drop Wire Runs; Drop Wire Spans; Inspection of Outside Plant; Installation Procedures; Maintenance of Outside Plant; Noise Conditions; Pole Yard Arrangements; Poles, Average Weights; Poles, Framing Details; Poles, Stacking Methods; and Regrouping of Rural Subscribers.

Many companies are ordering copies of TE&M's new Handbook for distribution to employes. Prices are: 1 - 5 copies $2.00 each; 6 - 25 copies $1.75 each; over 25 copies $1.50 each.

As our supply is limited we suggest you fill out the order blank (at the right) today.

Send All Orders To —

Educational Division,
TELEPHONE ENGINEER
PUBLISHING CORP.,
7720 Sheridan Road,
Chicago 26, Ill.



Oregon Independent Telephone Association's "Newsletter" recently published a review of TE&M's new Handbook and stated — "This should be on the desk of everyone who is concerned with up-to-date telephone service."

HANDBOOK ORDER

Educational Division **Date** .....
Telephone Engineer Publishing Corp.
7720 N. Sheridan Rd.
Chicago 26, Ill.

Please send copies of TE&M's new "Telephone Handbook For Managers and Plantmen" as indicated below:

Check One

..... (1 - 5) copies @ $2.00 each
..... (6 - 25) copies @ $1.75 each
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the cable gauge. The most common loading scheme in use today for subscriber loops is designated the H88 scheme. The letter H indicates the distance between load coils and the number 88 indicates the inductive value of the coils in millihenrys.

For the loop considered in this example, the loading arrangement would appear as shown in *Figure Four.* The gain derived from the H88 loading is calculated from the formula shown in *Table Two* and is 4.5 DB for the 25.0 kilofoot loop in this example. Subscribers may be connected only within the 4.0 kilofoot section at the end of the cable in this example, or within a 9.0 kilofoot section at the end of the cable if only three load points had been used (this will limit station separation to 9.0 kilofoot to insure adequate dc current to the transmitters of both telephones during a reverting call).

The total distribution section including bridged taps should be limited to 12.0 kilofoot. When the loading gain is added to the loop loss in this example, the result is a —2.14 DB (T+R)/2 (see *Figure 3B*). This loop still does not meet the —4.0 DB average objective, so the next step required to improve transmission is by the use of high-efficiency sets (such as W.E. 500, Leich 100 and AE 80 series). The gain of a high-efficiency set over the older AST set is dependent upon the conductor loop resistance and is shown graphically in *Figure Two.* Since the loop resistance in this example is 1,000 ohms, the full 5.0 DB gain of the high-frequency set is realized and when added to the loop loss previously calculated results in a —7.14 DB (T+R)/2 loop (see *Figure 3C*).

By following the resistance design and transmission check procedure, any type subscriber loop can be designed to meet today's supervision and transmission limits. During the process of the design work, consideration must be given to such questions as: Will long line equipment be necessary? Will cable or open wire bridged taps be involved to the extent that they will affect transmission? Will excessive amounts of drop wire be involved at the subset location? Will the interim arrangement meet transmission and supervision limits? And consider other pertinent design considerations.

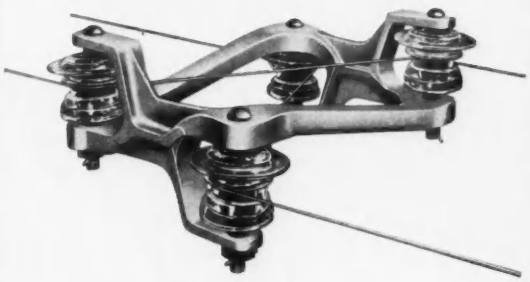
To summarize the design of local loops, the following procedure should be followed:

(1) Determine the central office conductor loop resistance limit for the central office involved (consideration should be given to ultimate limit if office is to be changed out in the future).

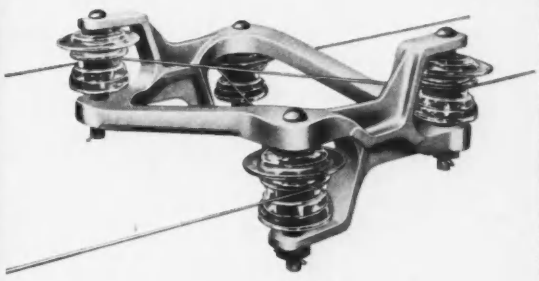
(2) Determine ultimate design loop length taking into consideration any open wire extension of the loop.

(3) Locate on the resistance design work sheet the point corresponding to the ultimate design loop length and the allowable conductor resistance (allowable conductor resistance is central office limit reduced by resistance of any open wire, load coils, temperature penalty, negative impedance repeater resistance, carrier filters etc., in the loop). If the point falls on one of the diagonal solid gauge lines, it will be known that the pro-

Case Aluminum High-Strength Span Transposition Brackets, originally designed for 8" wire spacing, *can* be used for 12" wire spacing, when turned to a right angle as follows:



EXAMPLE #1 — 12" Right over Left
SE-1786 right hand, 8" high-strength span transposition bracket gives a **12" Right over Left** wire transposition when turned to a right angle.



EXAMPLE #2 — 12" Left over Right
SE-1795 left hand, 8" high-strength span transposition bracket gives a **12" Left over Right** wire transposition when turned to a right angle.

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posed cable will be a single gauge cable corresponding to the gauge of the diagonal line on which the point falls. If the point falls between two of the diagonal lines, it will be known that the proposed cable will be of two gauges corresponding to the two gauges shown by the diagonal lines between which the established point falls. In this case draw from the established point, a line to the left and parallel to the line for the coarser of the two gauges involved until it intersects the line for the finer of the two gauges. The horizontal distance of this line from the zero length axis is the allowable length of the finer gauge.

(4) Using the appropriate loop loss factors determined by the total loop length (cable plus open wire), calculate the total nonloaded loop loss.

(5) Determine the number of load points required to completely load the loop (cable portion only), where the total cable involved exceeds 18.0 kilofeet. Calculate the loading gain from Table No. 2 and subtract this value from the nonloaded loop loss figure arrived at in (4) above.

(6) From *Figure Two* determine the gain of the high-efficiency subset for the resistance value corresponding to the loop resistance. Subtract this value from the loaded loop loss figure arrived at in (5) above (high-efficiency subsets can usually be justified from an economical viewpoint to be placed on loops 10 kilofeet or more from the serving central office).

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While we don't claim to have all the answers, we'll welcome the opportunity to discuss as many as possible in our columns.

(7) Add additional loss of bridged tap lines and long line equipment to figure obtained in (6) above and the result will be the total loop loss calculation.

While the procedure as outlined covers the basic subscriber loop design, there will always be special design cases covering such services as paystations, private branch exchange trunks, subscriber carrier loops, long rural loops requiring long line equipment and local talking battery subsets, and others that will surely develop with changes in the customer's service requirements and the increase in the use of electronic devices in exchange plant.

With the use of the resistance design method for local loop design, there will be better transmission, time (which means money) will be saved in engineering of plant, and important economies will be realized. Because of these advantages, the adoption of this method on an industry-wide basis presents considerable merit in our day to day operations of furnishing more and improved service to our subscribers at existing or reduced costs.—*F. E Elrod.*

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the telephone notebook

Let's all back off, take a good look at ourselves, and see if we can't improve that important big item—attitude.

■ Tremendous influence in the business world and in our home life is exerted by our day-to-day attitude towards our job, our fellow workers, and friends. It is quite obvious that more and more large business organizations are allocating a large portion of their budgets toward educating their employes in how to obtain and maintain the right attitude each day.

By attitude we mean how you actually feel (deep down inside) toward your job, your co-workers, your boss, your customers, and yourself. Children and dogs seem to know instinctively how you feel toward them. They're not the only ones, believe me. So does your customer — the person you talk to regarding his bill, — the man who calls you, Mr. Supervisor, because it's been two weeks and his phone is still not connected – the fellow who can't find a telephone number in the book, and he knows doggone good and well the party has a phone. These people know by your tone of voice and your *attitude* just exactly how concerned you are about the bill in error, the service for the new subscriber, and the missing phone number.

"How's Your Attitude Today?"

And here is something that can be cultivated – genuine, sincere interest in the problems, however minor, of our subscribers. It would certainly be so easy to say "Yes, sir. Yes, sir. I'll report your trouble," to an irate customer in an impersonal tone of voice and then to immediately forget the whole matter, but how much better to take a few minutes more and actually hear the problem out; perhaps even try to explain to him just why his particular phone is not working, if this is applicable.

Are the repairmen working 24 hours a day after a hard wind storm, but just haven't been able to reach his area yet? Is there a cable throw in progress and a certain section of town temporarily out of service?

Ninety-nine per cent of the people we meet daily are nice, human individuals, anxious to work with you and eager to meet you half way. True enough, the remaining one per cent can make things "rough," but they are such a minority and a rewarding "Thank you," from a grateful subscriber for a little extra interest on your part can so far offset this small group that it is well worth the effort to extend a friendly, helpful hand to all, even if that hand does get bitten occasionally.

So much for your attitude "customer-wise." How do you feel toward your fellow worker? There is nothing as wonderful as working day after day with a group of friendly, warm people and there is nothing as discouraging as trying to do a good job each day among a group of chronic gripers and "I'm mad at the world" people. One unhappy dissatisfied person in a group can contaminate the

Tips From The Field

Show Area Code and Telephone Number on Stationery

■ Here's a reminder that telephone companies should be practicin' what we've been preachin'.

The "sermon" theme for businessmen has been, as the August issue of *Telebriefs* put it: "You'll be doing your customers a favor — and inviting more orders — if you include your phone number on all printed business pieces. You'd be surprised how folks appreciate having your number handy when they want to call you."

This advice, of course, applies to everyone — especially telephone people. If you're about to order more stationery for your office or home, here are some recommended ways to display your complete telephone number:

Area Code 311 KL 5-2368 Area Code 311 Telephone 555-2368 Area Code 311 KL 5-2368

Showing your telephone number — complete with area code — on all your stationery is an expression of courtesy and thoughtfulness. And you'll want to tell your non-telephone friends about this, too. — *Illinois Bell.*

Something For Tomorrow

■ Telephone operators of the future will use a new type of pushbutton switchboard, now being developed by the Bell System. It will give assistance on the

many kinds of long distance calls that do not go through on a fully automatic basis — collect calls, for instance, person-to-person calls and numerous others.

Tomorrow's switchboard will probably look much like this preliminary model. An interesting feature of the board is that it indicates visually the telephone number of the calling party or of the telephone called.

"Dial-A-News"

■ If Americans have a common characteristic, it's "curiosity." And if there are any prime targets to this inquisitiveness, they most probably would be "Time," "Weather" and "News."

For the past quarter of a century, the public has picked up the phone, dialed a couple of telephone numbers, and received instantaneous "Time" and "Weather" information. Today, the Bell System has provided the facilities in Cleveland, Ohio, for another new service: "Dial-A-News."

Cleveland's W-E-R-E Radio initiated this unique telephone service in conjunction with Ohio Bell, whose telephone service plus Bell Lab's 8A Announcement System made this "telephone news" possible.

"Dial-A-News" provides up-to-the-minute local, national and international "news" flashes around the clock by W-E-R-E's award-winning news staff to anyone calling TOwer 1-8800 in the greater Cleveland area. Nearly a million news inquirers have used this revolutionary news service already.

atmosphere for the entire force.

Perhaps your day started right. You feel good. It's almost pay-day and you just bought a new dress (or that boat you've been longing for so long) and you are at peace with the world. Mary Smith comes in. She's not feeling well, has a sinus headache. The bills came in this week and the office will be over-flowing with customers anxious to be assisted and usually in a hurry. Some will be irritated and anxious to quarrel. All these points will demand your attention and her attention. You visit a minute with Mary and she points all this out to you just before the office doors open. Lo and behold the glow is gone. It's not such a wonderful life after all.

Home cares should be left where they belong, at home. So you've been up since 4 a.m. with your youngest son, who is not up to par. Keep it to yourself. It is a wise employe indeed who leaves his aches and troubles at the door as he comes to work each day. Nobody, but nobody, loves a complainer and it's the gal or guy who usually has a ready smile for everyone who goes on up the ladder to success the quickest. We are not advocating that you become a Pollyanna each day. That just isn't human. We all have an off day occasionally, but don't let matters get out of hand and use your co-workers as a sounding board for family and financial troubles.

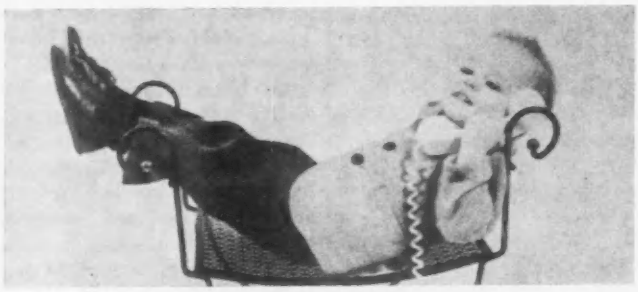
O.K., we've expounded on the proper attitude toward customers and co-workers. Now, how do you feel about your boss and your company? Let's face it. Are you actually proud to be an employe of the telephone company? If you're not, move on. You're working on the wrong job!

A good employe takes personal pride in the fact that his company is growing, pride in the new buildings it is constructing, pride in his position with the company, and pride in the improved service the company is offering subscribers. Don't for a minute feel that the telephone company *is* the executives and the higher echelon only. They're not, not anymore than our new president *is* the United States of America. The people are, and he is our representative. You, as an individual employe, actually influence a much larger portion of the people in their conception of the company than anyone else. You, Mr. Employe, *are* the telephone company to the people.

When you do a good job of install-

ing a telephone for a new subscriber and he, in turn, is well pleased, this subscriber immediately decides that we are an efficient, well-organized group; or if the phone was haphazardly installed (perhaps even the wall damaged) then you may rest assured that his opinion of the company is bad. Once this happens, it is hard to convince him otherwise.

Let's all of us back off, take a good look at ourselves, and see if we can't improve that important little item — attitude. The one to benefit the most will be you. How's your attitude today, bud??? — *Adapted from an article written by Bobby Taylor and printed in the July 1961 issue of "The News," published by the Southwestern States Telephone Co.*



"In The Year 2000"

■ QUESTION: — (To *H. M. Boettinger,* assistant vice president in the Planning & Development Department, A.T.&T.): *"What sort of things might our home telephones do for us in the year 2000, that is, besides simply making possible person to person telephoning?*

■ ANSWER: "The telephone in the year 2000 will be a pretty versatile tool. You'll have a telephone with you wherever you go. All autos, or whatever we're traveling in in the year 2000, will have them. And no matter where you are, you'll be able to call almost anyone else in the world — or out in space.

"Each baby may be assigned a telephone number at birth. Friends will be able to reach him throughout his lifetime — simply by calling that number.

"The telephone — or whatever it is called in 2000 — will serve as a master control unit around the house. It will answer the door — you'll be able to see and talk to the caller from any part of the house. It will control appliances — enabling you to cook your food, cool and heat your house — from remote locations.

"You'll be able to shop by telephone — seeing the merchandise in color. And you'll be able to take training courses the same way.

"Yes, we're convinced that by the year 2000 the telephone will be much more than a means of conversing. In fact, while it will still carry a great deal of talk, it will carry an even greater amount of information in other forms.

"For example, it's our belief that things you read — like magazines, newspapers and trade journals — will be delivered to your home or office instantly via telephone lines.

"These things are already being planned, and there are more to come.

"Your telephone plays a mighty important role in your life today, but you'd be lost without it in 2000." — *(Ohio Bell News In Brief)*

Trailer Housed Exchanges

■ A telephone exchange in a trailer, an innovation only three years ago, has become almost standard practice of the British Columbia Telephone Co. in providing dial service for small communities.

As a result of success with a trailer exchange in 1958 at Chetwynd, north of Prince George, Canada, there are trailers in use throughout the company's system and three more are to be added this year. A trailer, sometimes known as a portable exchange,

Next page, please

"Tele-Stories"

"Logical Question"

■ KARL DREUKE, Grand Rapids, Mich., plant engineer, is convinced that kids nowadays can think of a good many things. A question asked by a small boy after Dreuke gave his talk, "Conmunication Skyways," for an assembly group in a school almost made him lose his composure, but not quite.

The boy stood and said, "You say that microwaves travel in a line. Does this mean that they encircle the globe and that is why we are now seeing TV programs that are three years old?"

"Holy Moses"

■ IN SAN ANTONIO, Tex., C. D. Brandle, coin collector for Southwestern Bell, says he's seen everything! This all came about a few weeks ago when a Brownsville, Texas, coin box yielded four slugs. The slugs were gold plated discs from a charm bracelet or piece of jewelry.

Ironically, each slug was inscribed with one of the Ten Commandments — including the seventh "Thou Shalt Not Steal."

"Make Those Slots Bigger"

■ A FEW WEEKS ago Gainesville, Tex., customers started receiving IBM cards with their bills, and one customer sent the following note along with payment.

"Change inside. Sorry I messed up the card, but I thought those holes were to be used to put coins in, and then I read the little book that you put in our bill. So I do hope I didn't ruin the card before I found out."

"Dialing" or "Darling"

■ IN NEW YORK CITY a French-speaking African attending the U. N. General Assembly recently asked a telephone company friend if we had robots here who sometimes answer the phone and call people "darling."

The telephone man figured out that the robot in question was probably a recorded voice, and asked the visitor if he was certain that the robot had called him "darling."

"Mais oui," he said emphatically, "La voix a dit plusieurs fois: 'Ze numbair you are darling eez not a working numbair.' "

New Reference Books

■ **"The Cost-Manager," by John D. Stanley; published by the American Management Association, 1515 Broadway, Dept. TE&M, New York 36, N. Y.; 288 pages, cloth bound, $6.75.**

Effective cost control does not result from arbitrary penny-pinching, crash programs or short-term enthusiasms. It is not an emergency device to combat recessions or sudden foreign competition.

Cost control is, says Mr. Staley, an integral part of sound management. It exists in every company that is well managed, regardless of sudden shifts in the market or the labor force. He explains why continuous attention to costs is a key element of every executive's job and shows how to establish an effective cost reduction and control program.

■ **"The Employment Interview," (Research Study 47), by Milton M. Mandell; published by the American Management Association, 1515 Broadway, Dept. TE&M, New York 36, N. Y.; 110 pages, $4.50.**

This book reports on two AMA surveys of current interviewing practices in 273 companies and 140 college placement offices. It is written for any employment interviewer, whether he is a line manager who is required to conduct these interviews from time to time or a full-time interviewer. Ranging from interviewing methods and procedures, through the selection and training of the interviewers themselves, this 110-page Research Study comprehensively reports on a basic element of company recruitment. Statistical data and 28 pages of reproductions of actual personnel forms — used by leading companies for various kinds of interviews — add to the usefulness of this study.

■ **"Developing Competent Subordinates," by James Menzies Black; published by the American Management Association, 1515 Broadway, Dept. TE&M. New York 36, N. Y.; 128 pages, clothbound, $4.50.**

When you develop competent, self-reliant subordinates, you strengthen your company's competitive position and increase your own chances of success in management, says the author. It is his thesis in this book. The author tells how to: create an atmosphere for accomplishment, present information and instructions clearly, put a new employe to work without loss of time or motion, follow up and check his progress closely, encourage suggestions, criticize constructively, and win and hold the employe's loyalty. Counseling, committees, conferences, job rotation, and other management development tools are discussed, and suggestions are given for dealing with workers whose personal difficulties impinge on their job efficiency. The author gives special attention to problems of training the young workers now entering the labor market.

■ **"Management's Talent Search," by P. W. Maloney; published by the American Management Association, 1515 Broadway, Dept. TE&M, New York 36, N. Y.; 160 pages, $4.50.**

This book will be useful to any manager responsible for recruiting competent personnel — for the specialist in charge of a large-scale, continuous recruiting program, for the small company executive who cannot afford an elaborate operation, for college placement officers, and for every personnel man who is — or may become — responsible for recruiting competent professional and administrative personnel.

It is a compilation of do's and don'ts of recruiting — planning and central staffing, non-campus operations, campus recruitment, inplant operations, communications, and progress reporting.

■ **"Top Management Committees, Their Functions and Authority," by M. R. Lohman; published by the American Management Association, 1515 Broadway, Dept. TE&M, New York 36, N. Y.; Research Study 48, 64 pages, $3.**

Who makes top management decisions — committees or individual executives? To answer this question, AMA surveyed 93 companies, in which a total of 319 management committees are in operation. This study summarizes the results. It sets forth the conditions and defines the fields in which executive action by committees has been effective. The report provides information on how management committees are classified, how they operate, and the specific functions and authority with which they are invested.

brought the first telephone service to Chetwynd.

However, in most areas the portable units have been used to convert the communities from manual to dial services. In some cases small manual exchanges located in rented quarters have been replaced with new units of automatic equipment in a trailer. If the need arises, a portable exchange also can be replaced with a larger trailer to meet demands for added telephone facilities. In Chetwynd growth dictated the need for a permanent building in 1960.

The unattended units, connected to a major exchange for operator services, are constructed and equipped in Vancouver and have been sent to such far-flung spots as Field, Quadra Island and Cariboo locations. Transportation has been by rail, water or tow-truck. Removable axles are fitted to the units for towing for trips that have covered up to 500 miles.

The size of the portable exchanges depends upon location and service requirements, such as the 40 telephones at Beaver Cove, a Vancouver Island logging community; and the 220 telephones at Boston Bar, a community in the Fraser Canyon. To date, the trailers have differed in length, from nine feet all the way to 35 feet.

300,000 Poles To Count

■ This modern age never ceases to turn up wonders. One of the latest has taken place in the Plant Department of General Tel. Co. of Ind., with Louis Cook, inventory and appraisal engineer, as its "author."

A far cry from the days when records were chiseled in stone is Cook's idea for using a tape recorder to gather field record information on pole lines.

It was a recent decision that all pole records should be prepared for complete mechanization and also that initial surveys be made of what GT had on hand in the way of plant property acquired through the purchase of other companies.

Faced with some 300,000 poles that either had to be verified, initially inventoried, or tagged, all methods that would lessen the expense were considered.

In actual field study it was found that one engineer was capable of re-

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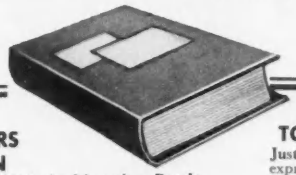

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cording on sheets and a map 16 poles per hour. Teams of two engineers could double this output and required only one vehicle where two would be needed if the men were working alone.

But Cook was still not satisfied that this method was the most efficient and continued to search for the "one better way." He found it.

A light portable tape recorder was given to a field engineer, who simply called off his tabulations in the same order as they appeared on the form he had previously used for such work.

Through this process, field studies showed that one man could record on tape an average of 34 poles an hour — equalling the two-man team — and in one day recorded an unbelievable 324 poles in a six and one-half hour period!

Only two tape spools, costing sixty cents each, are needed for an eight-hour day, and, of course, can be used several times.

The problem of converting from tape to written record was solved when a plan was worked out with the accounting department to have an employe tabulate the information on the pole location record form as the tape recorder played back the data.

This more efficient process will effect a gain of recording more than 200 poles a day. Questionable items are at a minimum and the need to cross-reference tabulated material has been completely eliminated.

Exploratory studies are now being made to determine whether the tape recorders can provide a means for obtaining basic information for all records which will be mechanized in the future. — (*Indiana General News.*)

"SAFETY CORNER"

Ladder Safety Tips

(Continued from 9/1 TE&M)

Rolling Ladders

(1) — Five recent accidents were the result of falls from central office rolling ladders. One of these accidents resulted in a lost time work injury. It is therefore very important that we again review with all central office employes, and any other people who may have an occasion to work in central offices, the need for following safe working practices when using central office rolling ladders.

(2) — Rolling ladders are to be inspected at periodic intervals. However, a visual inspection should be made before such a ladder is used.

(3) — Inspect the general condition of steps, sides and hand rails, to see that they are not cracked or broken and that they are free of splinters.

(4) — If there is evidence of wax on the steps it should be removed before the ladder is climbed.

(5) — Standard rolling ladder wheel blocks should be used to prevent the accidental movement of the ladder while working aloft. When the ladder blocks are not in use, they should be stored in a convenient location where they will be readily available and will not present a tripping hazard.

(6) — All central offices having rolling ladders should be equipped with blocks. Sufficient blocks should be available for each ladder on which a man may be working.

(7) — Always face a ladder when ascending or descending, grasping the hand rail and taking no more than one step at a time.

(8) — Never stand with one foot on a rolling ladder step and the other foot on a frame, etc.

(9) — When working on a rolling ladder, be careful not to strike your head or body on any superstructure which may be above or near you.

(10) — Do not overreach from ladders.

(11) — Never climb from a rolling ladder to the top of the superstructure or other elevated points unless the ladder is securely held by another employe.

(12) — When working on a ladder that extends part way into an aisle, suitable measures such as blocking off the area, etc., should be used to inform others who may be passing the ladder that there is a man aloft.

(13) — Avoid using rolling ladders as scaffold supports unless absolutely necessary. When so used, ladders shall be securely lashed to prevent shifting.

(14) — In general, not more than one man shall work from a rolling ladder at the same time.

(15) — Never jump or climb from one rolling ladder to another.

(16) — Where practicable, tools, materials, or equipment, shall not be placed on ladder steps. A standard apparatusmans' tool box is available and should be used.

(17) — Before descending a rolling ladder, look down and make sure no other individual, tools, or equipment is on the steps.

(18) — When stepping from the ladder and before letting go of the hand rail, make certain of your footing on the floor. *Do not push the ladder away from you as you step off it. "Look before moving."*

(19) — Ladders shall be moved slowly and kept under control to prevent striking other employes or equipment. Keep a firm grip on the ladder. Do not give it a forceful push or use one foot to do so. Hold the hand rail and use the other hand to move the ladder.

(20) — When it is necessary to move a ladder across an intersection aisle, extreme care shall be taken to preclude striking someone who may be passing.

(21) — When necessary to work on a rolling ladder for an extended period of time and a ladder seat is not used, employes shall pass one leg over a step to prevent falling from the ladder. However, a ladder seat should always be used if available.

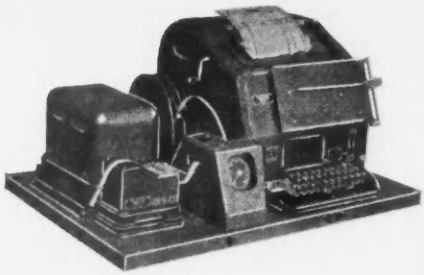
(22) — When ladders are left unattended, tools, test boxes, material, etc., should be removed or securely fastened. In addition, it is desirable to leave the electric lights burning during this interval so that others who may attempt to use the ladder, can more easily see that it is in use. When work is completed, all items shall be removed from the ladder.

(23) — "Look before moving" signs should be installed on all central office rolling ladders.

Placing Ladder Seat

(1) — Place the rolling ladder at the desired location with the weight evenly distributed on all wheels, and the ladder wheel blocks in place.

(2) — When the ladder seat is to be used on a step which cannot be reached from the floor level, climb the ladder, holding the seat on one shoulder with the seat in



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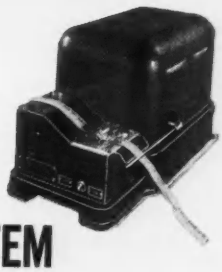

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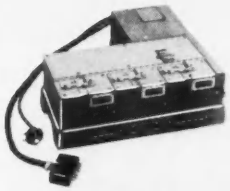

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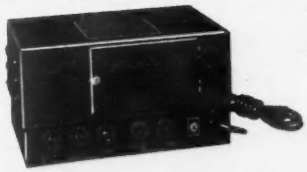

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an upright position, keeping the other hand on the hand rail.

(3) — After ascending to the desired working height, place the seat on the step with its' hanger irons over the step to be used, tilting the seat slightly upward at the outer end so that the hanger hooks engage the ladder step fully.

(4) — Test the ladder seat before climbing upon it and before releasing your hold on the hand rail, by applying downward pressure on the outer edge of the seat.

(5) — While grasping the ladder on each side, swing the body over the edge of the seat from which the work is to be performed. Be sure you are well balanced to prevent the ladder from tilting.

(6) — Adjust the body to a suitable position before relaxing hold on hand rail.

(7) — When using a ladder seat, place tools and apparatus in compartment provided *after* the seat has been placed in position.

(8) — Dismount from the ladder seat and remove it in the reverse order of placing and mounting the seat. Be sure that all tools and materials have been removed from the seat before lifting it off the ladder.

(9) — Under no circumstances shall an employe stand on a ladder seat.

Conclusion

(1) — An innocent looking ladder can be a very dangerous and hazardous piece of equipment. Serious thought must always be given to proper usage and care.

(2) — Unsafe acts of employes are the cause of most ladder accidents.

"The Boss" and His Buttons

■ Here's a question I'll bet you could ask a thousand working people and never get the right answer. The question is "Who's your boss?" There's only one boss and whether a person shines shoes for a living or heads up the largest corporation in the world, the boss remains the same. It's the customer. Here is one person who pays everyone's salary and decides whether a business is going to succeed or fail.

And he doesn't care if a business has been around a hundred years. The minute it starts treating him badly, he'll put it *out* of business. This boss, the customer, has bought and will buy everything you have or will ever own. He's bought all your clothes, your home, your car, pays for your children's education and your vacations. He pays all your bills, and he pays them in exact proportion to the way you treat him.

The man who works deep inside a big plant on an assembly line might think he's working for the company that writes his pay check, but he's not. He's working for the person who buys the product at the end of the line. And if the person doesn't like the product he won't buy it; and eventually, if this continues, he fires the man on the assembly line. In fact, he'll fire everyone in the company from the president on down. And he can do it by simply spending his money someplace else. This is one of the reasons why taking pride in the work we do is important to us personally. Aside from the joy that comes from doing an exceptionally good job, it will help get more customers, keep the ones we've got, and insure the weekly pay check.

There was a laundry that kept breaking the buttons on my shirts. I don't send them there any more. There must be hundreds of men who had the same experience who have stopped sending their shirts to this laundry. Now eventually — it may have already happened — the person running the press that kept breaking shirt buttons has to lose that job. He'll be fired by the customer, and the laundry loses thousands of dollars. The customer loses, the company loses, the employe loses. Doesn't help anyone.

The customer is always fair. He can be won back if you don't let him go too long. He'll spend his money with you if you earn it, and he'll bring his friends. You can fool him once, but seldom twice and you're only fooling yourself if you try. You get in your car and drive across the country and tell by looking at any business, from a little corner grocery store to a mammoth corporation, exactly how it's treating the boss by seeing the the way the boss has been treating the business — *By Jerry Brown, in "Indiana Bell News."*

"CHARLIE" by Jim Counts

2—4/4—4/2—2

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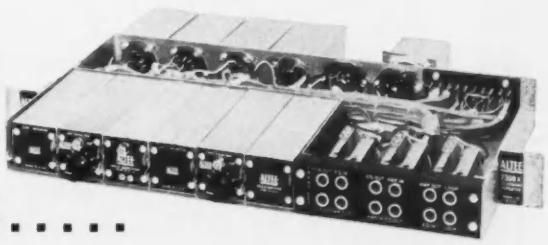

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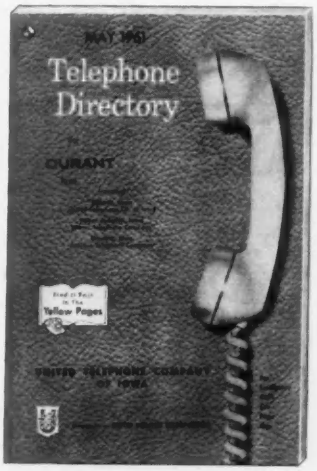

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After the presentation of Certificates of Completion, graduates of USITA's 1961 Management Development Program, their families and friends enjoyed a buffet supper at the Kansas Union Building.

U S I T A Management Development Program Graduates Honored at University of Kansas

PARTICIPANTS in the 1961 Management Development Program, sponsored by the United States Independent Telephone Association (USITA) at the University of Kansas School of Business, Lawrence, Kan., were honored August 11 at graduation ceremonies held at the Kansas Union Building in Lawrence.

The program, designed to help executives do a more effective job in their current positions and to help them prepare for more challenging responsibilities, was planned by the USITA Personnel Committee and the University of Kansas School of Business, which presented the program.

Instruction was within the areas of functions of administration, the American business climate, and rate regulation. Functions of administration was subdivided into control and financial administration, human relations in business, marketing and administrative policy and planning. The American business climate focused on economic, political, and social aspects of the development of the whole community, local as well as regional and national.

The faculty consisted of experts in their respective fields from the University of Virginia and the University of Kansas. Dr. James R. Surface, formerly of the Harvard Business School faculty, now dean of the University of Kansas School of Business, was program director.

The case method of instruction

Among those attending ceremonies honoring graduates of USITA's 1961 Management Development Program at the University of Kansas, Lawrence, were (l. to r.): Dr. JAMES R. SURFACE, dean of the School of Business, University of Kansas, and director of the program; R. J FEGAN, pres., Junction City (Kan.) Telephone Co., and chairman, USITA Personnel Committee; KENNETH L. DALLY, vice president and director of personnel, Western Power & Gas Co., and Telephone Subsidiaries, Lincoln, Neb.; and ROGER L. SINGLETON, University of Kansas, Lawrence.

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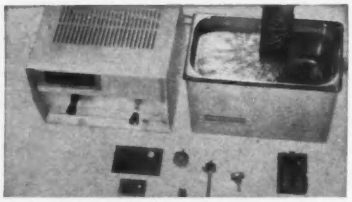

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was used throughout the program. This required the individual first to analyze an actual business problem and then to test his ideas about the case against those of his colleagues and the instructor. This steady diet of case problem analysis and discussion worked to increase the student's ability to analyze business problems, make better decisions, and to communicate more effectively with business associates.

Participants in the program lived in the air-conditioned Grace Pearson and Douthart Halls, while all classes and meals were taken in the air-conditioned Student Union Building less than a block away.

Doctor Surface, in his greeting to the graduates, said "Including today's honorees, 131 telephone executives have completed this four-week course including participants from Hawaii, Central and South America, as well as from all corners of the continental United States. Speaking from the point of view of the university, our association with the participants of each of these sessions has been a most pleasant and stimulating one; and we hope that the relationship will continue."

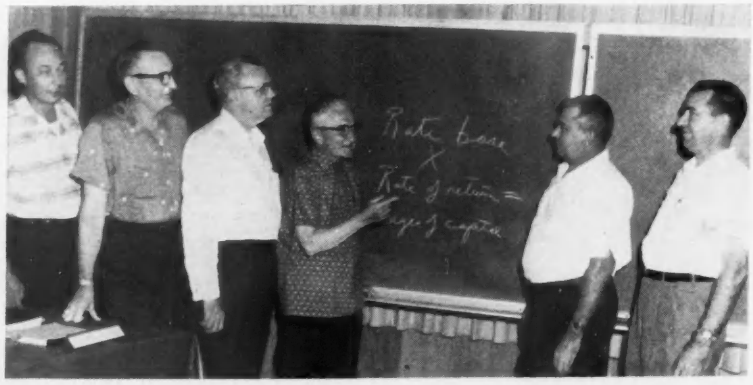
Robert J. Fegan, president of the Junction City (Kan.) Telephone Co. and chairman of the USITA Personnel Committee, introduced the commencement speaker, Kenneth L. Dally, vice president and director of personnel of Western Power & Gas Co. and Telephone Subsidiaries, Lincoln, Neb.

Early in his remarks, Dally explained "The United States Independent Telephone Association represents 3,300 Independent telephone companies with $4,000,000,000 invested in telephone plants; with 100,000 employes, serving more than 11,500,000 telephones; and having gross revenues of approximately $1,028,500,000 per year."

The core of Dally's address was associated with what he referred to as "America's greatest relatively undeveloped resource," which he explained lies in the ability of its citizens to think. He proceeded to outline several illustrations tending to show that even our well-qualified citizens are not thinking as carefully as they should.

"If all of the time consumed in complaining, in criticizing and in loose talk, by people who are capable of contributing to the improvement of the situations referred to," he said, "could be converted to productive use, this world would be much better off and the importance and happiness of the individuals involved would be substantially increased."

Admitting that some citizens are doing more effective thinking within specific areas than has ever been done before, Dally emphasized there is basis for serious question as to whether "*most of our citizens are*



Members of this USITA Management Development Program class are (l. to r.): ROBERT TOWNSEND, Central Tel. Co., Hickory, N. C.; J. B. SWINK, Texas Tel. & Tel. Co., Corsicana, Texas; W. CARL ALLEN, Eastern Illinois Tel. Co., Rantoul, Ill.; A. J. PRIEST, University of Virginia, Charlottesville, Va.; GERALD RICHWINE, General Tel. Co. of Ind., Inc., Fort Wayne, Ind.; EDWARD C. GARNETT, Jr., Lexington Tel. Co., Lexington, Va.

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■ Made up of industry members who have devoted at least 15 years to the task of enabling their fellow citizens, however far apart, to talk instantly with each other, at any time of day or night, and, in recent years, with practically anyone anywhere in the world, the Independent Telephone Pioneer Association represents a group whose aim has been, and is, service to the public.

■ Since the organization was founded it has grown from its original roster of 74 members to 5,400 members. The reason for this growth was expressed some time ago by two Pioneers.

■ One said: "The Independent Telephone Pioneer Association is the instrumentality whereby recognition can be given for the work the member has performed and the status he has reached . . ."

■ The other said: " . . . with real pride in my business it is only natural therefore that I should have similar pride in my membership and the memberships of our company in the Independent Telephone Pioneer Association . . . We should do our part in perpetuating the Pioneer Association, of which we have every right to be proud, standing as it does for long and faithful service."

■ Although exclusive and coveted, membership in the Independent Telephone Pioneer Association is not restricted to any special group.

■ Your company can give its support to the aims and goals of the Pioneer group by joining the ITPA as an Associate Member today.

■ Your company's application for an Associate Membership in the ITPA will receive the prompt attention of the ITPA Membership Committee. Why not fill out the application and mail it today.

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ANNUAL DUES $.....*
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ANNUAL DUES MUST ACCOMPANY APPLICATION

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Signature (Print or Type)

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thinking as much or as well as they did previously."

To illustrate his point, Dally referred to an engineering manager of one of our country's largest manufacturing companies.

"He told me," Dally said, "that, for example, his company only hires graduate engineers who are in the top 10 per cent of their class, and yet they are distressed to find that although these young engineers recite rules and formulas with precision, three-quarters of them have not learned how to think.

"As he also indicated, employers generally are not vitally interested in knowing specifically what any of us learned in school, but they are vitally interested in finding out what we can do and whether we have learned how to think.

"He told me about an improvement in some of their manufacturing equipment that they had been working on over a long period of time; that after numerous efforts to expedite completion of this improvement, he found it necessary to go to the location of the plant involved.

"At that plant he met with the numerous executives and manufacturing engineers who had been working on the project and listened to each one tell of the problems he had been experiencing in his efforts to get his part of this improvement completed.

"After a couple of days of listening and giving careful consideration to each of the comments made, it occurred to him that a big part of the problem might be growing out of the fact that they were trying to fit a part of the combined unit into a small 8-in. area.

"Consequently, he asked each man around the conference table to indicate whether the problem would be alleviated, so far as his part was concerned, if the 8-in. area was increased to a foot or even to as much as 18 in.

"After several more sessions, it became apparent that all parts of the problem would be removed if this 8-in. area could be expanded to a foot.

"He then inquired why they had concluded this particular part of the unit needed to be confined to an 8-in. area. The only answer was that such a limitation apparently had been assumed from one of the preliminary drawings.

"These learned men, all experts in their respective fields, had set up an artificial seriously delaying barrier between themselves and their objective, and despite numerous conferences over an extended period of time, they had failed to think the problem through.

"If our well qualified citizens fail to do their share of the clear, perspective thinking that needs to be done, then what kind of leadership can we reasonably expect and what will be our destiny?"

Stressing that everyone, consciously or unconsciously, is anxious that his importance be recognized, Dally warned that many of us are failing, day after day, to do the very things

that would give us importance.

"How do we gain importance, except through our making contributions to our families, to our companies, and to our fellow men generally, which are at least as great as the benefits we receive from them," he asked, "and how do we make any real contributions, except through the intelligent, productive, expenditure of mental and physical efforts which means work?

"Somehow we must stop and help our associates stop underestimating the importance of our work, whatever it is, and give greater recognition to the facts—that through our work, we make contributions which help to justify our existence and give us, our families, and our companies the importance, the security and the happiness we all seek.

"When our committee, Dean Surface and his associates set up the USITA Management Development Program, our primary objective was not to make yours and your companies' work easier, but instead to make your acomplishments and your importance greater . . ."

Dr. JAMES R. SURFACE, (center) of University of Kansas congratulates USITA Management Development Program graduate HOWARD M. KEEN (left) of the General Telephone Co., of Fla., Lakeland. In background (right) is ROGER L. SINGLETON of the University of Kansas.

Referring to the 1961 USITA Management Development Program, Dally stated "The real test as to whether you graduates, our committee, Dean Surface, the faculty and others who have assisted with this program, have done well depends not on what we, who are very close to this program, might be inclined to say to each other here today, but

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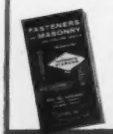

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on the extent that you and your companies are going to benefit in the years that lie ahead and as a result of your participation in this program.

"You inevitably will be demonstrating the answer," he said, "so far as you and your company are concerned, during each day of the next several years. While doing so, I know you will continue to recognize that none of us, as individuals, accomplish very much; that the best efforts of each of us must be integrated with the best efforts of the over-all team, if we are going to get important jobs done well. We hope the records finally will establish that we all, and you particularly, have done well."

After the presentation of Certificates of Completion by Doctor Surface, a reception was held for the graduates and their guests, among whom were families of the participants, and members and directors of the United States Independent Telephone Association.

Kappel Named A T & T Co. Board Chairman; Eugene J. McNeely Elected President

FREDERICK R. KAPPEL was elected chairman of the board of the American Telephone & Telegraph Co. and was succeeded as president by Eugene J. McNeely at a meeting August 16 of the company's board of directors. Kappel will continue as chief executive officer of the company, the first time in AT&T's history that its chairman also has held that post.

At the same time, in a series of top-level changes, William C. Bolenius, executive vice president, was elected vice chairman of the board; James E. Dingman, vice president and chief engineer, was named to succeed McNeely as executive vice president; and Claude M. Blair, vice president-staff of Pacific Northwest Bell Telephone Co., was elected a vice president of AT&T with responsibility for space communications programs, a new position in the company.

EUGENE J. McNEELY, newly-elected president, AT&T Co.

FREDERICK R. KAPPEL, chairman of the board and chief executive officer of AT&T Co.

In announcing these changes, the board said they "were being made to most effectively meet the increasing complexities and long-range growth of the business."

Kappel served as president of AT&T since Sept. 19, 1956, and during his tenure as its ninth president the company experienced some of its greatest growth. Recently the company added its 2,000,000th stockholder, and during the past five years the number of telephones served

W. C. BOLENIUS, executive vice president and vice chairman of the board of AT&T Co.

by the Bell System has risen by more than 15,000,000 to a total of 62,000,000.

During this period direct distance dialing, data processing and other strides in telephony have advanced at a tremendous rate of progress and the Bell System has contributed a large share to bringing the nation to the threshhold of a satellite communications system.

Kappel conducted negotiations with James E. Webb, administrator of the National Aeronautics and Space Administration, which led to the company being the first to sign a contract to conduct its own satellite communications experiments.

Before election as president of AT&T, Kappel served for about three years as president of the Western Electric Co. when the Bell System's manufacturing arm established new production records for its telephone and government customers. He had been president of Western Electric from Jan. 1, 1954, to his election on Sept. 18, 1956, as president of AT&T.

Kappel has risen through the ranks of the telephone industry. He began with Northwestern Bell Telephone Co. in 1924 as a groundman, after his graduation from the University of Minnesota with a bachelor of science degree in electrical engineering.

He served as a lineman, cable splicer's helper, frameman, testboard-

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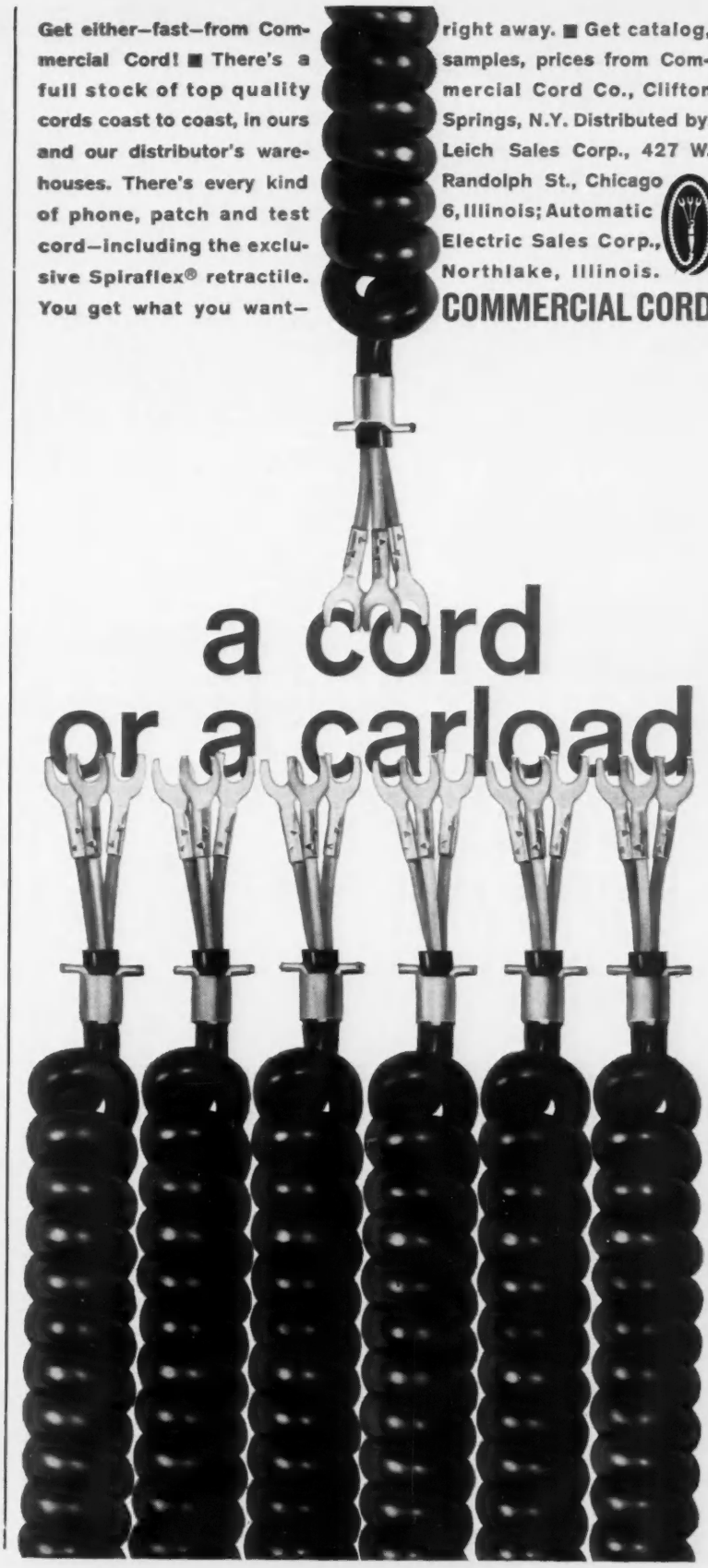

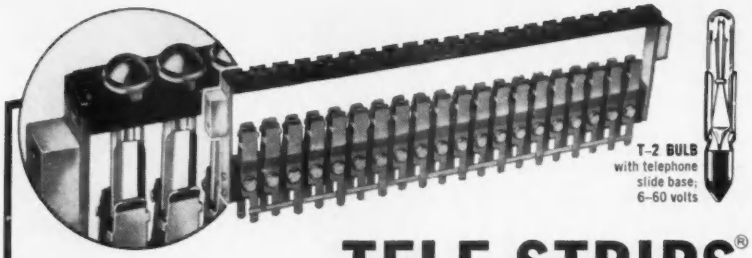

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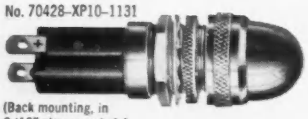

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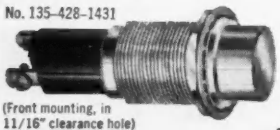

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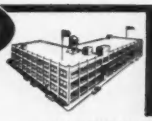

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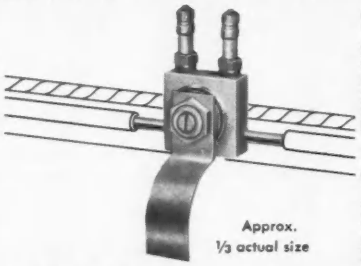

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JAMES E. DINGMAN, executive vice pres. of AT&T.

man, and apprentice switchman with Northwestern Bell in Minnesota, and after 10 years was equipment and building engineer.

After three years as plant engineer in the Nebraska-South Dakota area, he went to Northwestern Bell headquarters as plant operations supervisor in 1937. He became assistant vice president-operations in August, 1939; operations vice president in October, 1942; and a director of the company two months later.

On Jan. 1, 1949, he joined AT&T as assistant vice president in the Operation and Engineering Department (O&E Dept.) and was elected AT&T vice president in charge of the Long Lines Department two months later. Near the close of 1949, he returned to O&E as vice president, the post he held until his election as president of Western Electric.

He received the University of Minnesota "Outstanding Achievement Award" in 1954, and is a Fellow of the American Institute of Electrical Engineers.

The new AT&T president, McNeely, had served as executive vice president of the company and a member of the board of directors since October, 1955. Before being elected executive vice president, he had served from November, 1953, as vice president in charge of the O&E Department. Previously, he had been personnel vice president for little more than a year after coming

CLAUDE M. BLAIR, newly-elected A.T.&T. vice president.

to New York in September, 1952, from the post of president of the Northwestern Bell Telephone Co.

McNeely began his telephone career in 1922 with the Southwestern Bell Telephone Co., and remained with that company for 26 years. In 1937 he was appointed division plant superintendent at Kansas City, and four years later he was named general plant supervisor of the company. He was appointed general plant mgr. of Southwestern Bell in 1947 and a year later joined AT&T as asst. vice president, personnel relations.

McNeely became vice president-operations of Northwestern Bell on Jan. 1, 1949, and in December of the same year was elected president of the company.

Bolenius has been an executive vice president of AT&T since September, 1958. The new vice chairman of the AT&T board had been vice president-finance of the company at the time of his election as executive vice president.

He joined the Bell System in 1921 as a traffic inspector with the New York Telephone Co. After holding various positions in the Traffic Department, he was elected vice president and general manager of the Upstate Area in 1943. In 1946 he was elected vice president and general manager of the Wisconsin Telephone Co. and was elected president of that company later in the same year.

He was elected vice president of

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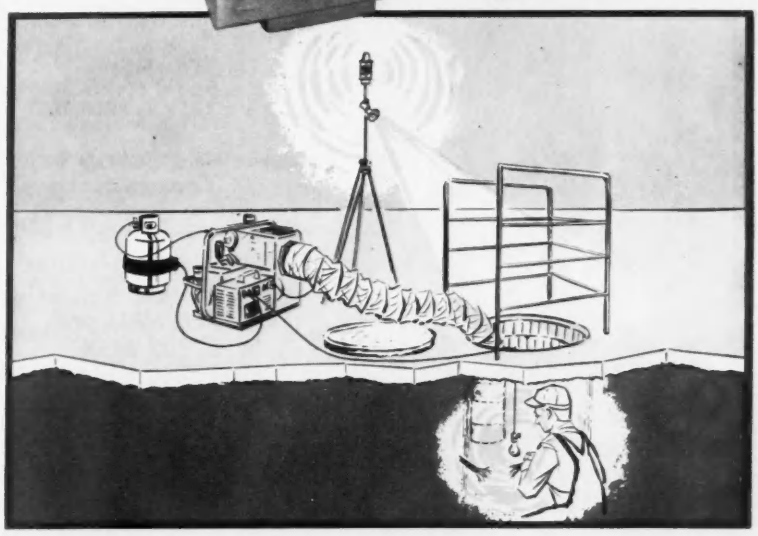

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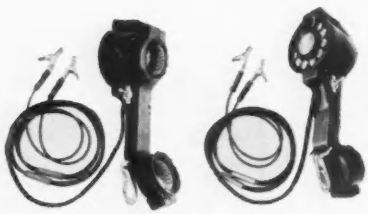

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AT&T in charge of personnel relations in 1948 and was named vice president-finance in 1951.

Dingman was director of operations of the AT&T Long Lines Department at the time of his election as vice president and chief engineer of AT&T, effective Dec. 1, 1959. The new AT&T executive vice president had served as Long Lines director of operations from Nov. 1, 1956. For four years previously, he was vice president and general manager of Bell Telephone Laboratories.

Before joining the laboratories, Dingman had served as a vice president of the Bell Telephone Co. of Pennsylvania from 1949 to 1952, first in charge of personnel and later in charge of operations. He began his telephone career in 1922 as an installer for the Western Electric Co., and two years later joined Long Lines. He then served as division plant superintendent, employe relations manager, and assistant to the general manager of Long Lines.

Blair was one of the four vice presidents named to posts with Pacific Northwest Bell when it was established as a new operating unit of the Bell System in February, 1960.

Previously he had been Colorado vice president and general manager of the Mountain States Telephone & Telegraph Co. He began his telephone career with the AT&T Long Lines Department in 1930. After working in various positions in the Long Lines Plant Department, he joined the AT&T Commercial Department in 1952 and was government communications manager before being appointed assistant treasurer of AT&T in 1957. He transferred to the Mountain States company the next year.

After the recent changes in organization at the top AT&T Co. management level, Kappel announced these lines of organization:

McNeely, president; Bolenius, vice chairman of the board; H. P. Moulton, vice president and general counsel; P. C. Mabon, vice president; and A. G. Barry, vice president and secretary, will report to Kappel. McNeely, as president, will act as chief executive officer and chairman of

the executive committee in Kappel's absence.

Dingman, executive vice president; H. T. Killingsworth, vice president; S. B. Cousins, vice president; and G. L. Best, vice president, will report to McNeely.

G. N. Thayer, vice president; Wellington Powell, vice president; C. M. Blair, vice president; and W. K. MacAdam, vice president, will report to Dingman.

Bolenius, as vice chairman of the board, will continue to be responsible for financial matters and will preside at board meetings in Kappel's absence.

P. A. Gorman, executive vice president; J. W. Cook, vice president; A. L. Stott, vice president and comptroller; and L. C. May, treasurer, will report to Bolenius.

E. B. Crosland, vice president; L. S. Miller, vice president; and J. J. Scanlon, vice president, will report to Gorman. Revenue requirements organization units under C. S. Watt and C. A. Ulffers, both assistant vice presidents, will report to Scanlon.

L. M. Berry & Co. Announces Management Appointments

SEVEN management changes have been announced by L. M. Berry & Co., Dayton, Ohio: J. P. White named southern area manager, with headquarters in Louisville; R. A. Maner appointed Florida area manager, with headquarters in Tampa; B. D. Addington became special representative for the eastern territory, with headquarters in Bristol, Tenn. and W. J. McGirl was made southern manager, with headquarters in Louisville.

Also, C. A. Smith was appointed Florida division manager, with headquarters in Tampa; J. D. Beckham was named mid-eastern division manager with headquarters in Bristol, Tenn. and R. F. Watts was appointed Tennessee division manager, with headquarters in Nashville.

White joined L. M. Berry & Co., on August 27, 1920, in Louisville. For the next several years he carried out sales and supervisory assignments in the eastern, central, and

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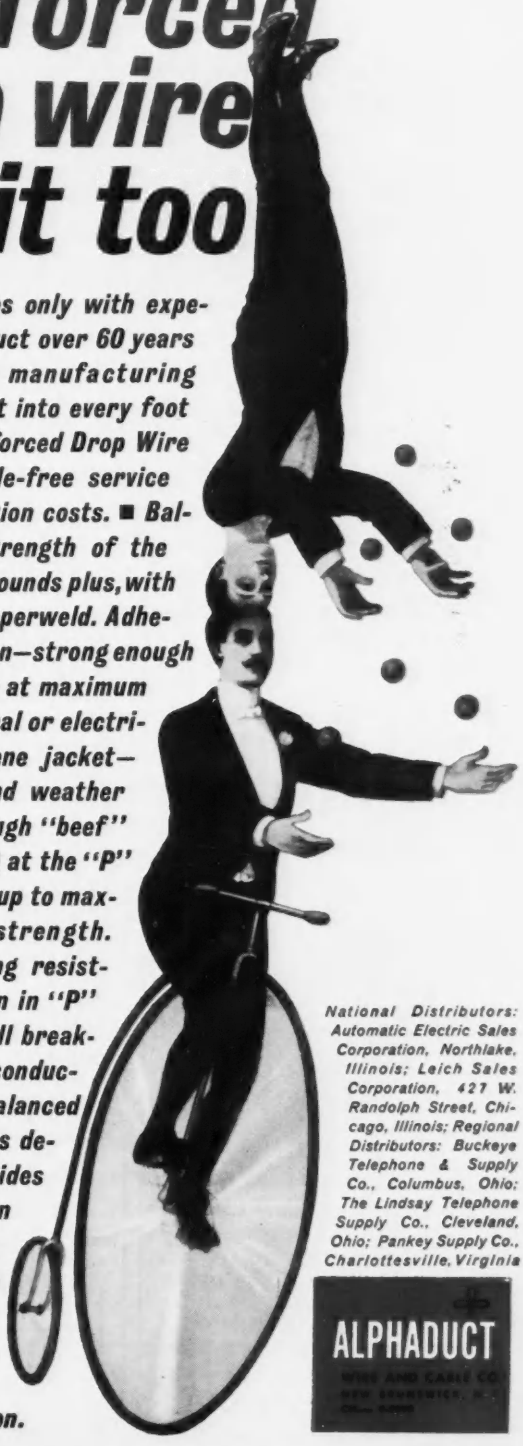

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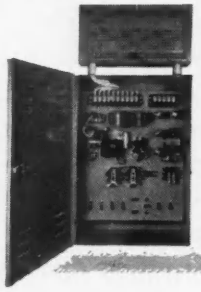

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WHITE

MANER

southern sections of the country. In 1942 he was appointed southern manager, and served in that capacity until his recent appointment.

Maner joined the company on April 18, 1931, in Tampa as a salesman and traveled extensively throughout the firm's operations in sales and supervisory capacities. In 1941 he was appointed Florida district manager and was named Florida division manager in 1947. He held this post until receiving his new assignment.

McGIRL

SMITH

McGirl was employed as a salesman on October 29, 1947, in Birmingham, progressing through various supervisory assignments until April 15, 1951, when he was named Alabama division manager. After serving subsequently as manager of the Ohio and Louisiana division, he was appointed southern sales manager in December, 1954, holding that position until his appointment as southern manager.

Smith began his association with the firm on October 9, 1947, as an Alabama division salesman. He later carried out supervisory assignments in the Florida division, remaining there until January 1, 1956, when he was appointed Louisiana division supervisor. He then held the post of division sales supervisor and division sales manager in Louisiana before his appointment as Alabama division manager on December 2, 1957. On

BECKHAM

WATTS

September 25, 1958, he was appointed Tennessee division manager and served in that capacity until his recent assignment.

Beckham joined the company in May, 1949, as Tennessee office manager and become Tennessee division assistant in January, 1953. On October 26, 1953, he was named Mississippi division manager, and became Tennessee division manager on February 21, 1958. He was appointed southern personnel manager on September 25, 1958, holding that position until his new appointment.

Watts joined the firm in July, 1949, as a Kentucky division salesman. On October 1, 1955, he was appointed directory supervisor, and on June 1, 1959, became Kentucky division sales manager. On October 1, 1959, he was named general sales assistant, holding that position in the general office until receiving his new assignment, as the Tennessee division manager with headquarters in Nashville.

ADDINGTON

Graybar Names Clisbee To Houston Post

GRAYBAR Electric Co. Inc., has announced the appointment of D. E. Clisbee as acting manager of the company's Gulf Coast district which has its headquarters in Houston, Tex.

Clisbee, whose appointment as Gulf Coast district manager will become effective January 1, 1962, will replace the present district manager, V. R. Young, who will retire on a Graybar service pension.

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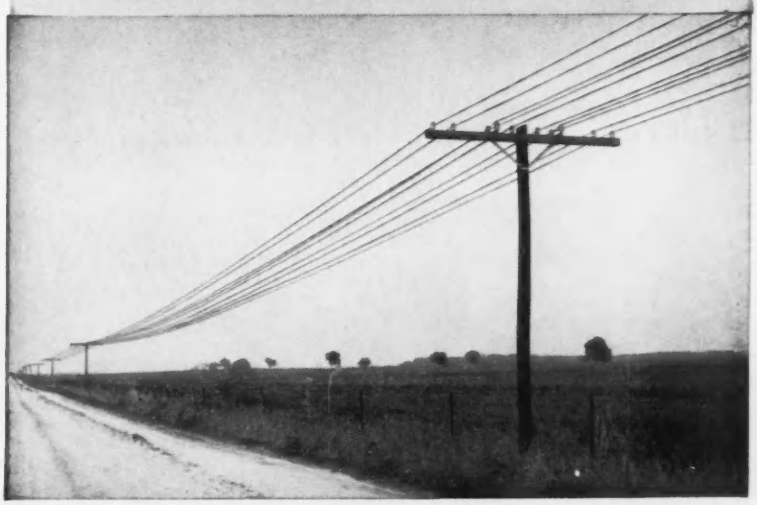

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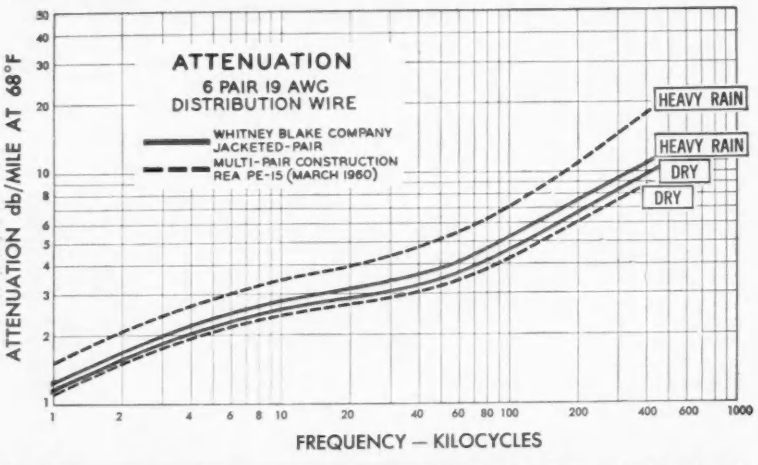

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Collins Announces New Alpha System Division

COLLINS RADIO CO. Dallas, Tex., has announced the integration of all microwave activities into one organization within its new systems division, the Alpha Corp. Simultaneously, the company revealed that Alpha, formerly a subsidiary, has now become a division of Collins.

This realignment of Collins microwave activities will unite sales, systems engineering, contract administration, training and customer service under a new director, Kerry R. Fox. In this new position, Fox will have responsibility for coordinating Collins' entire marketing and systems effort for commercial as well as government and international microwave and carrier sales.

Appointments in the new Microwave Systems Division under Fox were announced by T. A. Campobasso, assistant general manager of Alpha Corp. They include R. S. Willard, manager of microwave sales; L. M. Fisher, manager of microwave systems engineering; and H. G. Kraft, business manager for microwave contracts. The new appointees were previously in the microwave division within the Collins Texas facility.

Appointments in the sales group under Willard include: T. A. Farrell, staff assistant; Willard, acting manager, eastern area sales; R. M. Millner, manager, western area sales; A. K. Urschel, manager, government sales; E. A. Jenkins, manager, sales service; and D. L. Smith, manager, customer service.

Eastern area sales offices and the men heading them are: H. E. Solem, Tallahassee, Fla.; W. T. Allott, Nashville, Tenn.; J. A. Dolsen, Detroit, Mich.; B. Farquhar, New York, N.Y.; and R. I. Hancock, Washington, D.C.

Western area sales offices and the men heading them are: D. F. Snyder, Denver, Colo.; W. D. Leonard, Los Angeles, Calif.; J. O. Fordham, San Francisco, Calif.; E. C. Vick, Minneapolis, Minn.; C. E. Little, Dallas; and R. G. Yount, Dallas.

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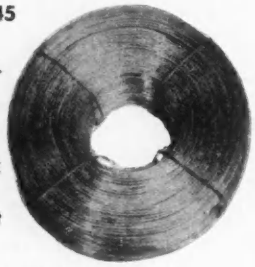

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NEWS AND VIEWS OF INDEPENDENT TELEPHONY

VOLUME 10, NO. 6 | Published by General Dynamics | Telecommunication | SEPTEMBER, 1961

Phone company and subscriber enthusiastic about features;

F-50 PBX wins double praise in use

"This subscriber's business was expanding; it was going to be necessary to change out the old manual PBX, and our customer wanted certain new features which only the F-50 seems to provide."

This from Mr. Al Nixon, vice president and general manager of the Chautauqua and Erie Telephone Company at Westfield, New York.

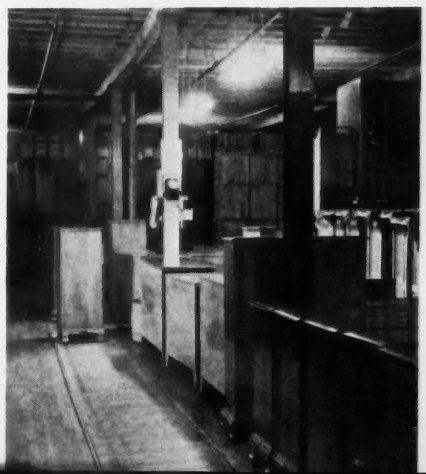
"They were particularly happy to be able to have such complete call transfer, consultation and conference service," said Mr. Rod Nixon, traffic and commercial manager of the telephone company.

The desirability of these features and others available in the F-50 PBX was immediately apparent when we arrived at the Kling Furniture Company office and main plant in nearby Mayville. This, like the Chautauqua and Erie Telephone Company, is a family owned and operated enterprise. Now in its 50th year, the Kling organization has continued to expand; now has two other plants in the same general area and sells its bedroom, dining room and specialty items through representatives coast to coast.

There is a great deal of intra- and interplant switching of calls, using local, short-haul and long distance facilities. Many urgent messages must be handled and transferred after regular working hours or on Saturday. Fast decisions involving more than one person or department must be made expeditiously. Code-call service is used a great deal to locate people whose work keeps them on the move. A telephone system with such complete flexibility and easy oper-

Mrs. J. F. Miller combines operating the F-50 turret with several other jobs. "At first," she said, "it just didn't seem possible that an operator's job could be so easy."

Telephones, usually the 1574-W standard desk instruments with transfer push key, or the Petite phone, are placed in strategic locations in the shop as well as the general offices. Top photo is of an assembly line; lower view is of warehouse area.



Responsible for this Stromberg-Carlson F-50 installation were (L-R standing): Rod Nixon, Floyd Berlin, and Al Nixon of Chautauqua and Erie Telephone Company; (seated) Mr. Chester Helgran of Kling Furniture Co.

Masthead photo: see page 126

Advertisement

Furniture factory finds F-50 fine

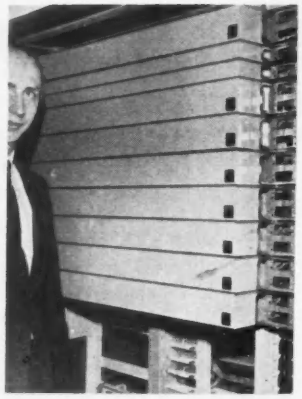
ation often from the station instrument itself, is the answer to lower sales costs in a highly competitive business.

Mr. Floyd Berlin, wire chief of the phone company, devised some extra service features through conferences with the Kling brothers and Mr. Chester Helgran, executive vice-president of the funiture company, as well as a director of the phone company. One such feature provides a spare outgoing trunk for the part-time attendant at the turret, so that an important call can be passed through, even though all regular trunks are in use.

The attendant, Mrs. Miller, had some difficulty at first in adjusting to the higher speeds and light touch of the keys. "It just didn't seem right for my job to be so easy."

While it is believed that this installation by the Chautauqua and Erie Telephone Company is the first in operation, it is hard to be sure of the exact date, since sales have been made in all Branch territories, and interest is increasing as telephone companies find how easy it is to "place" a PBX combining so many wanted features.

Said Mr. Don Kling, as we left after a complete tour of the furniture company, "This switchboard has already improved our telephone service greatly. When we complete our new offices soon, and are able to use all of the features we know are available, it will really be wonderful."



Floyd Berlin shows how little space is required for the switching cabinet: 4'1" wide, 2' deep, 6'4" high.

The Stromberg-Carlson F-50 PBX has won immediate attention because it has so many "wanted" features that appeal to the commercial subscriber, in an easy-to-learn operation that saves time and manpower.

A very important phase of furniture manufacturing is the compounding of stains and lacquers to meet rapid changes in demand. Formula room is a key station in the system.

Selected hardwoods, particularly the local rock maple, cover acres of Kling Company yards. Telephone service extends to yard office and truck garage.

Whitney joins network of Texas Tel. & Tel. XY® Dial offices

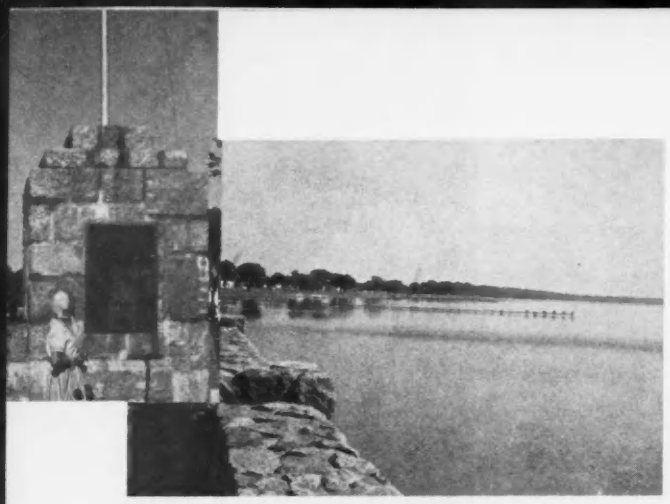
Pulling the strips in preparation for the cutover are, (l. to r.), J. B. Swink, general commercial and traffic mgr.; Mary Pevehouse, chief operator; Mayor Olin Carroll; and dist. mgr. Gerald Pevehouse.

He feels right at home. Busy Mayor Olin Carroll is used to handling village problems by phone. Here he places a call from new #3 Toll Board, assisted by Charles Renfro, traffic supervisor from Corsicana.

Another toll center has been added to Texas Telephone & Telegraph's growing network of dial offices in East Central Texas. Whitney, located 90 miles southwest of the Corsicana headquarters of the company, is the latest office to receive XY Dial and a Stromberg-Carlson #3 Toll Board.

More than 200 guests from Whitney and surrounding towns attended an open house at the 340-line office. Each guest received a key chain with a miniature PETITE® Phone as a souvenir of the occasion.

Texas Telephone & Telegraph representatives from Corsicana and Houston joined Whitney personnel for the conversion ceremonies.



Mille Lacs Lake is the center of one of Del Ludenia's telephone operations. Its wide waters beckon more and more people to stay longer and longer, summer camps being replaced by all-season homes. Inset shows a tourist reading plaque describing the discovery of this lake by early French voyagers.

As summer slips by, editor selects snaps

It's always fun—though sometimes risky—to reminisce.

In every editor's file there are countless stories still unpublished; photos saved because they recall a place, people, or an incident that you like to remember. So it is with these selections from a 1960 vacation trip visiting telephone companies in Iowa, Minnesota and Wisconsin.

The overwhelming grandeur of Mille Lacs contrasts sharply with the quiet, sylvan beauty of Crow Wing County chain of lakes; an hour's drive in central Minnesota—take your choice.

Fertile prairie states are Iowa and Wisconsin that provide a good share of the nation's food and fodder, and just enough industry for balance.

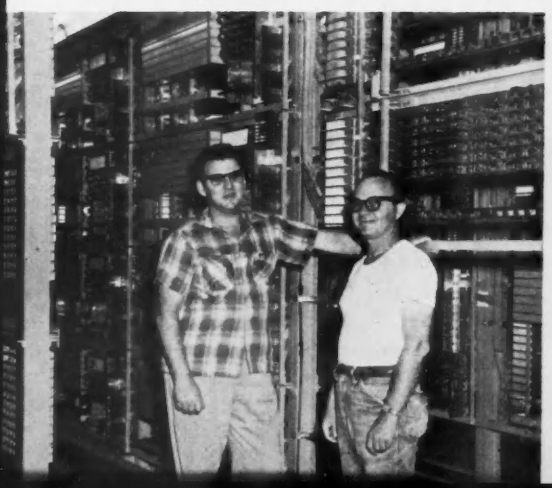
Managers, engineers, plant men, secretaries—busy, but glad to take a few moments to talk about their work and their plans; how their town is different, and why they believe in the future of the Independent industry. We enjoyed our visit with you!

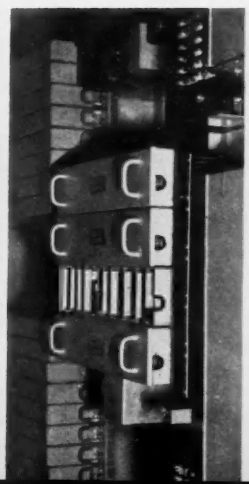
With only two hands and several jobs, Mercedes Atilano uses 6K-1 System and special modification of Stromberg-Carlson Hands Free Telephone to handle office calls, mobile switching service. All equipment for the latter was built by her manager, Frank Pearson, of West Branch (Iowa) Telephone Company.

Yes, Tom Snyder, your work keeping the grounds and buildings of the Chisago City (Minn.) Telephone Company so beautiful is important. A successful business turns a good face toward its public.

Harold Olson, president and manager of the Weyauwega Telephone Company, notes that his own station growth has always exceeded population growth in this thriving Wisconsin town.

Charles Otto (left), wire chief, and Claude Weatherly, C. O. repairman, run a neat and efficient exchange for A. G. Stradtman at Worthington, Minn. At Eldridge, Iowa, Ray Porter uses 561 Carrier to supply subscriber service over a physical circuit originally built into the country for fire reporting. Fairmount, Minnesota, is division headquarters for Central Telephone Company. Sharon Klopp, plant clerk, brings in some records for Del Edens and Ralph Coffin of the plant engineering section.





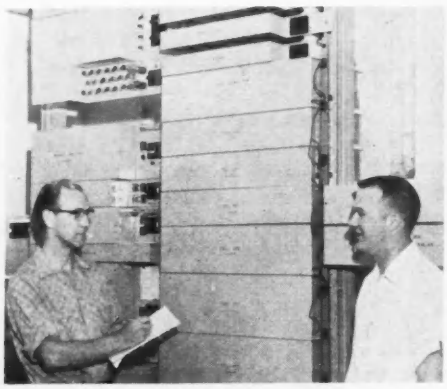
XY STROMBERG-CARLSON TRANSMITTER

Leesburg office is principal toll center for Florida Tel. Beautiful to see, efficient in layout and operation, it is symbol of company's leadership in area.

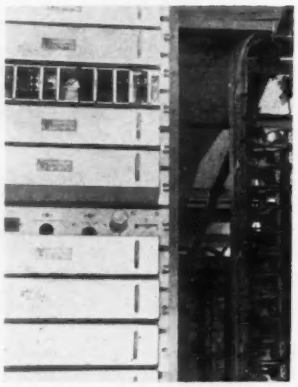
Max Wettstein (right) puts his finger on answer to rising costs of manual toll service. Robert Eshbaugh, Jr. (center) and George Masak heartily agree. This XY Toll Ticketing installation is at Mt. Dora.

Burton Brown, general traffic manager, goes over some toll reports with Mills Gillmore, assistant chief engineer. Toll accounting is done in Leesburg.

Florida Tel. Corp. meet costs of



Conley Kidd (left), chief switchman, and Al Lynch check readings at XY Toll Ticketing automatic readout equipment in Leesburg. Top corner photo on a preceding page shows Virginia Miller (seated) and Sybil Stewart operating IBM equipment that creates toll billing directly from automatic readout.



Stromberg-Carlson 561 Subscriber Carrier proves its versatility in this application as low-density multiplex equipment for rural circuits to remote areas where conventional wire line subscriber service would be impractical.

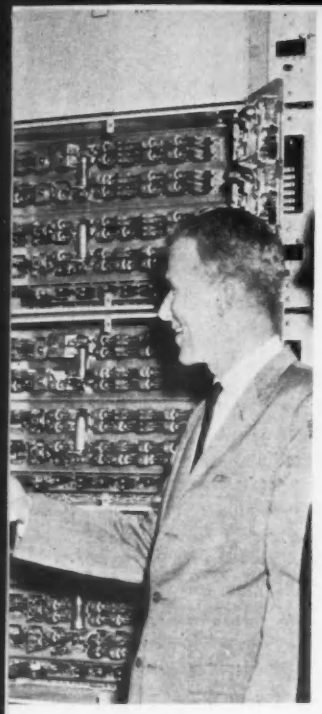
"Direct Distance Dialing and the conversion of revenue accounting to tabulating procedures highlighted our company's modernization program over the last two years."

Max Wettstein, president of Florida Telephone Corporation, was telling how this company had solved the problem that, in varying degrees of magnitude, faces all Independents in growth areas—how to support a continuing schedule of expansion while maintaining a sound financial position.

"Our toll messages have increased by over a million units in the last three years. DDD has provided faster service for our customers, and has at the same time been a very important factor in reducing traffic costs in spite of generally inflationary trends. We consider this to be our most important obligation as a public service institution."

Mr. Wettstein then became more specific about the various aspects of modernization undertaken by Florida

This central portion of Florida still creates a requirement for top-grade operator toll service. Mrs. Dorothy Shoaf (extreme left) is chief operator for 19-position toll board at Ocala. Without DDD several extra positions would be required.



Mickey White (right) and Bob Rees make routine maintenance check of Stromberg-Carlson 511 Multiplex equipment connecting Leesburg by radio relay with all other offices.

shows how to

expansion by modernizing

Tel. In the first place, all exchanges and sub-exchanges are dial operated. In some offices, equipment that could not economically be expanded has been replaced with XY Dial. Customers, by and large, can have the grade of service they want.

Local service has recently been extended to several areas that could not be profitably served in the conventional manner. Chief Engineer Robert Eshbaugh, Jr., asked to provide a suitable means for accomplishing this, proved that Stromberg-Carlson 561 Subscriber Carrier could be used as a low-density multiplex system for rural circuits where wire line plant was impractical. Several such isolated areas now have telephone service, for the first time—at a per-station cost reasonably within normal operating ratios.

Florida Tel's microwave network, making it feasible to centralize toll traffic and accounting, for greater operating economies, has been well publicized. Leesburg, in the geographic center of the territory, is one of the most modern toll centers to be found anywhere. Voice and data transmission circuits fan out from this busy hub via radio relay to all company toll offices; data for automatic readout and bill preparation feeds into Leesburg from all those offices where XY Toll Ticketing has been installed.

While the number of operator-handled toll messages at year-end exceeded the DDD calls system-wide, part of the answer lies in the fairly high percentage of person-to-person calls. It is expected that some time next year customer-dialed person-to-person calls will be introduced in one of the principal offices and gradually extended, both as an additional customer service and also as a further means toward operating economies.

Not every company faces the same situations as Florida Tel, but each company's own future will be assured through seeking modern solutions to the problems of today and tomorrow.

A Statement of POLICY

Now that we are a complete, separate Division of General Dynamics it is an excellent time to review progress and re-examine policy as a guide for tomorrow's operation. Such is my intent in these few brief words.

We have come a long way since 1894, when the first Stromberg-Carlson telephone was designed. Over the years, by a consistent policy of sticking to our main line of endeavor of building superior telecommunication equipment, we have earned an enviable reputation, reflected in continued growth.

We have resisted the temptation to become involved in, or associated with, telephone company operation. We have felt that our best service to the expanding Independent industry was to stay strictly in the manufacturing field. *This is still our policy.*

We have no financial ties with any operating or holding company, either apparent or hidden. We are designers, builders and suppliers of communication equipment for voice and data. We are pushing the state of the art into the electronic age with experience and know-how second to none.

We shall continue to provide the industry with the best and most practical equipment we know how to build. With the resources of our General Dynamics associates as part of our team, we have the strongest combination in the field—for your benefit.

We're plenty busy keeping you supplied with the best and finest in telecommunication equipment.

John H Vogt

President
General Dynamics
Telecommunication

Up goes quality. The "Q" (for Quality) flag, which accompanied the "RIQAP" award, is raised in front of the General Dynamics | Electronics headquarters building in Rochester, N.Y. Brigadier General Charles S. Hays, Commanding General of the U.S. Army Signal Supply Agency, assists in positioning the flag. Also participating in the ceremony were Gaylord C. Whitaker (left), president of Graflex, Inc., and Rochester's Mayor Peter Barry, right of flag.

General Hays holds "RIQAP" certificate awarded in recognition of quality production of electronic equipment for the armed forces.

Signal Corps presents product quality award to Telecom Division

The Telecommunication Division of General Dynamics | Electronics has again received the U.S. Army Signal Corps' "RIQAP" award in recognition of its "production of high quality electronic products for the armed forces."

"RIQAP," which stands for Reduced Inspection Quality Assurance Plan, is the highest quality recognition and honor the Army Signal Corps can bestow on a manufacturer.

Brigadier General Charles S. Hays, Commanding General of the U.S. Army Signal Supply Agency, presented the award to executives of General Dynamics | Electronics, who accepted for the Telecommunication Division and the Military Products Division, which was also honored.

In making the award, General Hays said: "Acceptance of General Dynamics | Electronics into RIQAP is a result of your company's thoroughness in manufacturing and quality assurance. It is a tribute to the diligence and cooperation of your people.

"Designed to assure the highest quality standards, the plan reduces the amount of end-product inspection by Federal Government through increased reliance on the manufacturer's own control policies and practices. It requires the most advanced quality control methods and test procedures from the manufacturer."

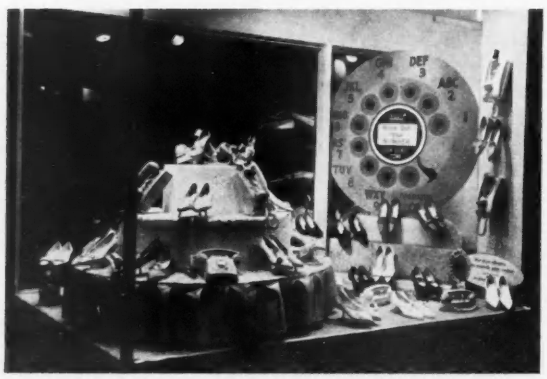
Window displays add punch to telephone sales story

The large number of subscribers who pay their bills by check has raised a bit of a problem for telephone companies—how to inform people who never visit the telephone office about new products and services.

Direct mail is one answer. Window displays are another.

The direct-mail approach continues to produce success. However, more and more Independents are adding to their sales punch with colorful displays in local shoe, apparel, and department stores.

An example of what can be accomplished may be seen in the attractive display arranged by the Dixon (Ill.) Home Telephone Company. Tieing in with a shoe store, the company emphasized the wide range of instruments and colors available to subscribers.



Creative selling at work. Large dial centers viewer's interest and attention, helps plant basic idea of telephone firmly in his mind. This is the kind of display that gets its message across to the public quickly and surely.

F. S. Coakley, executive vice-president of Dixon Home Tel, writes that several extensions were sold as a direct result of the promotion. An additional value of a display, he points out, is keeping new products and added services in the subscriber's mind. It lays the groundwork for future sales.

When created with imagination and interest, window displays can become a very important telephone sales tool.

Transmitter
GEORGE B. FORBES, Editor
J.T. LONG, Associate
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THE BACK OF THE BOOK

By JOHN G. REYNOLDS

Millionaires Are Scarce

WHY NOT let the millionaires pay most if not all of the taxes? They've got more money than anyone needs, so why not take it away from them for the benefit of the rest of us?

Well, here's why: According to the Internal Revenue Service, there are only 244 taxable incomes of a million dollars or more. And these incomes are taxed to the hilt now, with the top rate being a cool 91 per cent.

Moreover, says the *Citizens Public Expenditure Survey*, the taxes actually paid by the millionaire group are just enough to run the government for 25½ hours — a trifle more than one day. And even if they were taxed 100 per cent, the increase in revenue would merely support the government for another 14½ hours.

There just isn't enough money in the big or even the middle income categories to operate a $90 billion a year government. So the lower income people must pay the bill.

Complete Control

HAVE you asked your neighbor lately how he thinks the Administration's doing?

The chances are that he—like millions of other loyal Americans—will talk about what the government is doing about the foreign situation.

Well, we don't like the frigid war any more than the next fellow. But the sad fact is that while we're moaning about Moscow, the administration is hammering together a 10-program domestic welfare-state plan that would annihilate our basic American liberties.

Each of these programs includes a plan to increase centralism—the central government control of the vital elements of our economy.

Here's what the 10 programs would do: (1) Control factory location; (2) control wages in local intrastate business; (3) control local school systems; (4) control production and distribution of power; (5) control city development; (6) control the employment market; (7) control hospitals ... and ultimately medicine; (8) control the farmers; (9) control the market place; (10) control of capital accumulation through tax tinkering.

Or, to put it in two words:—Control us.

Greetings To A New "Right Hand"

ELSEWHERE in this issue we have told you about Bob Dorsett, who has joined TE&M as managing editor.

Your editor has known Bob Dorsett for several years, and it is a real pleasure to welcome him to the TE&M staff. His addition to the staff comes at a time when TE&M is adding new programs and new departments to keep pace, and even ahead, of the ever-changing communications industry.

You'll probably be hearing from Bob from time to time, and we hope you'll give him the same cooperation you have so kindly given this editor.

Bob Dorsett, and all the TE&M editorial staff members including John Reed, Dick Reynolds, Bill Corman, C. D. Ehinger, L. A. Gritten, D. A. Perigo, Allan R. Stacey, Pat Cullinan and your editor will be at the USITA Convention. Why not drop in on us at Room 560A in Chicago's Conrad Hilton Hotel, October 9, 10 or 11?

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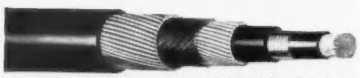

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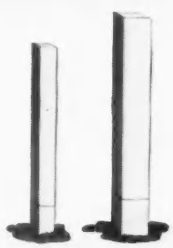

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Let our "Revenue Men"
TURN YOUR DIRECTORY PROBLEMS INTO PROFITS

Take a man like
Harold Verucchi

Harold is one of our "Revenue Men" in Princeton, Illinois.

He knows the territory well, and is well-known in the territory. In high school, Harold established a name for himself on the football field, the basketball court as well as the track cinders, and devoted his excess energy to the school paper, speech club and glee club.

After graduation, Harold started his business career as a wholesale routeman in dairy products. A short time later, he became a department manager in a chain store branch.

It was in 1953 that Harold joined General Telephone as a salesman in our Kewanee, Illinois, unit. He was promoted to Sales Supervisor of our Princeton unit in 1958.

Harold and his wife have two fine young children. You'll find Harold active in community groups like the Elks, the Princeton JC's, and his Men's Club at church.

Harold is typical of the "Revenue Men" who work for General Telephone Directory Company and for you. And they all have one thing in common—they are always an asset to any community in which they live.

Our Directory "Revenue Men" provide the Independent Telephone Industry with a flexible and highly skilled telephone directory organization. These men—working out of 35 strategic locations—are experienced specialists, trained to give you *complete* and *quality directory service.*

They act as telephone company representatives in their day-to-day contacts with your customers, not only selling and supervising the sale of Yellow Pages advertising—but also acting as public relations representatives for you in their dealings with the public.

Thoroughly trained to know any condition that pertains to telephone service, they're experienced hands at helping large and small Independent Telephone Companies "take the kinks out of knotty directory problems!"

Write or phone our office nearest you for our Complete Directory Service Plan.

GENERAL TELEPHONE DIRECTORY COMPANY

1800 Oakton Boulevard
Des Plaines, Illinois
VAnderbilt 7-6111

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